ANNOUNCEMENT

OF THE

STEVENS

Institute of Technology:

A SCHOOL OF MECHANICAL ENGINEERING.

FOUNDED BY

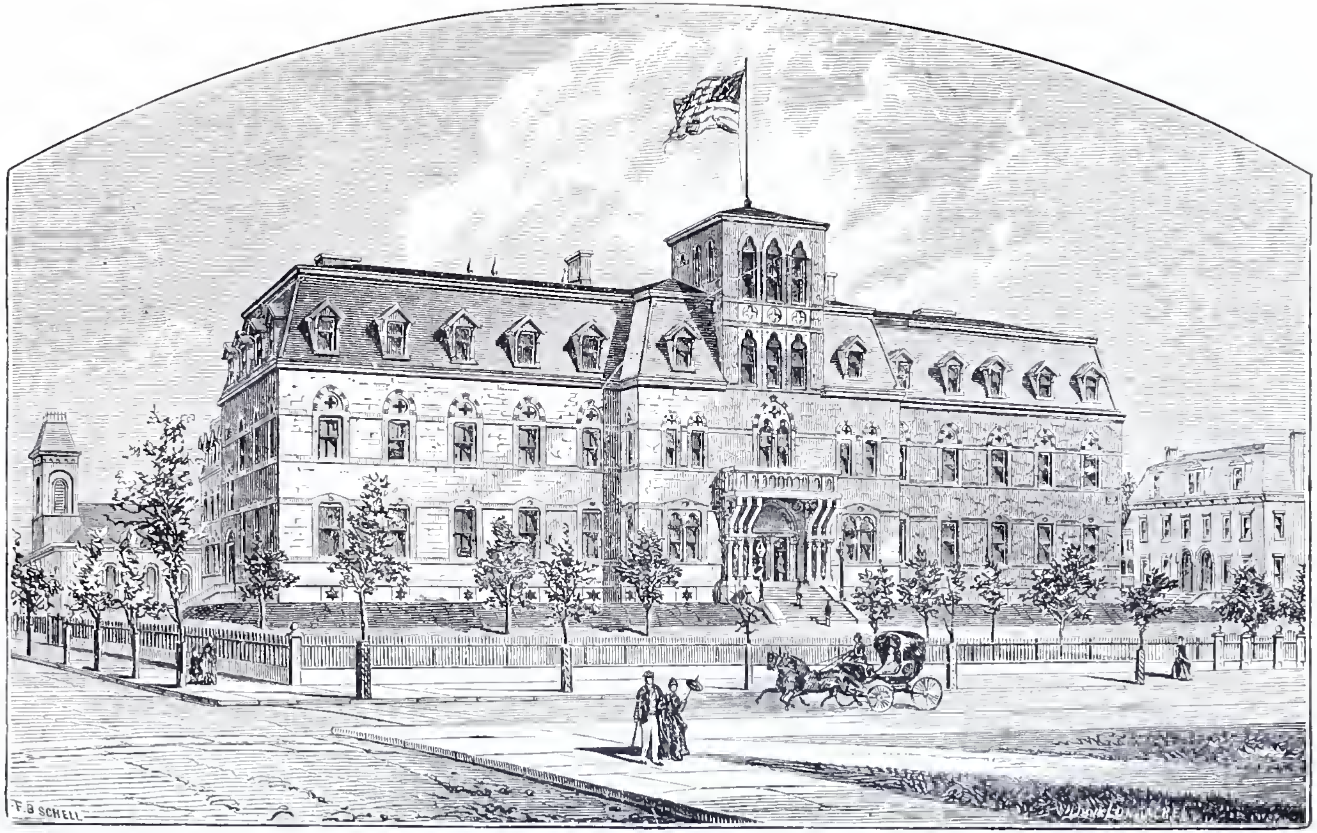
EDWIN A. STEVENS, ESQ.,

HOBOKEN, N. J.

1873.

New York:
RUSSELLS' AMERICAN STEAM PRINTING HOUSE,
17, 19, 21, 23 ROSE STREET.

PLATE I.



FRONT VIEW.

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210289

TRUSTEES.

Mrs. E. A. STEVENS. Rev. S. B. DOD.

WM. W. SHIPPEN, Esq.

FACULTY.

HENRY MORTON, Ph. D.	*President.*
ALFRED M. MAYER, Ph. D.	*Professor of Physics.*
ROBERT H. THURSTON, C. E.	*Professor of Mechanical Engineering.*
De VOLSON WOOD, C. E.	*Professor of Mathematics and Mechanics.*
C. W. MacCORD, A. M.	*Professor of Mechanical Drawing.*
ALBERT R. LEEDS, A. M.	*Professor of Chemistry.*
CHARLES F. KRŒH, A. M.	*Professor of Languages.*
Rev. EDWARD WALL, A. M.	*Professor of Belles-Lettres.*

GENERAL INTRODUCTION.

IN order to set before those interested in the matter a full and satisfactory view of the character and proposed work of this Institution, it has been decided to begin in this announcement with the history of the foundation, and the Charter of the Institute, to give a general account of the course of instruction proposed, and to point out the means, material and intellectual, which have been provided for this purpose.

THE FOUNDATION.

In the will of Mr. Edwin A. Stevens, bearing date April 15, 1867, occurs the following bequest:

"And I do further give, devise and bequeath to my said wife, Martha B. Stevens, William W. Shippen and Samuel Dod, and to their heirs and assigns forever, to hold as joint tenants, and not as tenants in common, in trust, as hereinafter mentioned, all that block of land in Hoboken bounded by Hudson street, River street and Fifth and Sixth streets (excepting such interests therein, if any, as I may not own at my death), and one hundred and fifty thousand dollars in the stocks and bonds of the Morris and Essex Railroad Company, reckoning the same at par—that is to say, one half of that sum in the first mortgage bonds of said company and one half in the said stock.

"I direct and empower the acting trustees or trustee under this trust (whether the original trustees herein named or the survivors or survivor of them, or his, her, or their successor or successors), at any time or times when one or two shall be dead or have ceased to act, to appoint one or two new trustees in his, or her, or their stead who shall have died or ceased to act; and, by advice of counsel, my trustee or trustees in whom the legal title shall be vested, shall convey, assure to, and vest in said three trustees (the appointing as well as the new trustee or trustees) the said trust property in fee simple as joint tenants, and not as tenants in common, in trust. And this trust is this: that upon said land, at such time as the acting trustee or trustees shall think proper—certainly within two years after my death—he, she, or they shall, out of the proceeds of said personal property (to be procured by sale or other prudent disposition, investment, use, or appropriation thereof, in the discretion of the trustee or trustees for the time being), erect, of some substantial but economical material as substantial and economical as trap rock, a plain building or buildings, suitable for the uses of an Institution of Learning, which I direct my acting trustee or trustees for the time being, out of the means herein provided, and such as shall proceed therefrom, with all convenient speed, and within three years after my decease, to establish there—employing, paying and discharging at his, her, or their discretion, the officers, and tutors, and servants thereof—and forever to manage and control, at his, her, or their discretion, but for the benefit, tuition and advancement in learning of the youth residing, from time to time hereafter, within the State of New Jersey; but my said acting trustee or trustees shall, from time to time, decide who of said youth shall receive the benefit thereof, and direct the tuition in said Institution, and make all proper By-laws, Rules and Regulations for the management of the officers, tutors, servants and scholars connected with said Institution.

" *The tuition is not to be wholly free, unless to such youth as said acting trustee or trustees shall direct; nor is it my intention that the cost of tuition of any youth shall be wholly paid by him or her. The proportion of payment by each youth I leave to the discretion of the acting trustee or trustees.* It is my intention that the Institution hereby directed and created shall be perpetual, and that the above mentioned original trustees and their successors shall forever continue and be the governors thereof, and have the superintendence of the same; and it is my will and desire that, if it cannot be legally done according to my above intention by them without an Act of the Legislature of the State of New Jersey, they will, as soon as possible, and certainly within three years after my decease, apply for an Act of the Legislature to incorporate them for the purpose above specified, and to effectually provide for the establishment and maintenance of said Institution with the means which I have devoted by this, my will and testament, to the said purpose; and I do further declare it to be my will and intention that the said real and personal property hereinbefore and hereinafter devised and bequeathed to my said trustees for said purposes shall, at all events, be applied for the uses and purposes above set forth; and it is my desire that all courts of law and equity will so construe this, my will, as to have the said property, real and personal, appropriated to the above uses, and that the same shall, in no case, for want of legal form or otherwise, be so construed as that my relations, heirs, devisees or legatees, or any other persons shall inherit, take, possess or enjoy said real and personal property hereinbefore and hereinafter devised and bequeathed for said purposes, except in the manner and for the uses hereinabove specified.

"I do also, out of the said last mentioned residue of my estate (excluding Castle Point and the homestead lot, and the houses thereon) remaining after the payment of my debts, the said eight hundred thousand dollars in legacies, and the appropriation of so much of my estate as is necessary to answer the beforementioned charitable bequests and devises, and the appropriation for the steam battery, give, devise and bequeath to my said trustees of said Institution of Learning, and direct my executors to pay to them, within five years after my decease, such sum of money, not exceeding five hundred thousand dollars, as the said trustees of said Institution of Learning, in their discretion, shall think necessary to be set apart, invested and appropriated to and for the purpose of forever maintaining the said Institution of Learning, for he purpose before described, so that the same be liberally maintained out of the income and interest of such sum and said sum of money, and the interest and income thereof shall be subject to all the trusts hereinbefore declared with respect to the said Institution of Learning, and the property appropriated hereinbefore for the erection, maintenance and establishment thereof; and I do, with reference to the said sum, and interest and income thereof, declare my desire and intention to be the same as I have before fully expressed with reference to the property before devised and bequeathed for the same purposes."

From the above it will be seen that a sum of money which, at the discretion of the executors, might be as great in the aggregate as $650,000, and a lot of ground (425 by 200 feet) was left for the foundation and establishment of "An Institution of Learning."

The executors, in the first place, decided upon making the appropriation to this object of the maximum amount as named in the bequest, and then, in view of the existing needs of the country at large, and of the personal interest always manifested by Mr. Stevens in the development of the mechanic arts, they also determined that the "Institution of Learning" should be a School of Mechanical Engineering.

The reasons for this decision there is no need here to discuss, since it is believed that abundant and sound cause for this conclusion will appear to any one sufficiently familiar with its relations to take any interest in the matter.

Furthermore, for the more effectual fulfilment of the plans laid down by Mr. Stevens, and in the pursuance of the suggestion to that effect already quoted in his will, a Charter or Act of Incorporation was obtained from the State of New Jersey, of which we quote the enacting clause:

"*First.—Be it enacted, by the Senate and General Assembly of the State of New Jersey,* That Martha B. Stevens, William W. Shippen and Samuel B. Dod, and their successors shall be, and they are hereby constituted a body politic and corporate, by the name of 'The Trustees of the Stevens Institute of Technology,' and by that name shall have perpetual succession, according to the provisions of said codicil, and may sue and be sued, implead and be impleaded, and may purchase and hold property, whether acquired by purchase, gift or devise, and whether real, personal or mixed, and may make and have a corporate seal, and the same break and alter at their pleasure, and shall have all other rights belonging to similar corporations by the laws of this State.

" *Second.—And be it enacted,* That the entire management of the affairs and concerns of the said Corporation, and all the corporate powers hereby granted, shall be and hereby are vested in the above mentioned trustees, to manage and control the same, as in said codicil provided.

" *Third.—And be it enacted,* That the trustees shall have power from time to time to enact By-Laws, not repugnant to the Constitution or Laws of the United States, or of this State, or to this Act, for the regulation and management of the said Corporation or Institution of Learning; to fill up vacancies in the Board, and to prescribe the number and description, the duties and powers of the officers, the manner of their appointment and the term of their office, as in said codicil directed and empowered to do.

"*Fourth.—And be it enacted,* That, for the purpose of carrying out the object of this Act, the said Corporation shall have power, from time to time, to purchase, take and hold real and personal estate, and to sell, lease and dispose of the same; provided, that nothing in this Act contained shall empower the said Corporation to sell, lease or dispose of that block of land in Hoboken bounded by Hudson street, River street, and Fifth and Sixth streets, if at any time the title to the same shall become vested in the said Corporation.

" *Fifth.—And be it enacted,* That the said Corporation shall have and possess the right and power of conferring the usual degrees appropriate to a school of Technology.

" *Sixth.—And be it enacted,* That this Act shall take effect immediately.

"Approved February 15, 1870."

PLAN OF THE INSTITUTION.

It was determined, as has been stated, to create a School of Mechanical Engineering, and as this was to be of a high educational order, and to involve a general and not a merely industrial training, it was thought best, in memory also of its munificent founder, to call the new school THE STEVENS INSTITUTE OF TECHNOLOGY.

The plan of instruction to be pursued is intended to be such as may best fit young men of ability for leading positions in the Department of Mechanical Engineering, and in those scientific pursuits from which this and all the sister arts have derived and are daily deriving such incalculable benefits.

With this view it is intended—

1st.—To afford a thorough training in the elementary and advanced branches of Mathematics, in so far as these are useful means of investigation and of work, and not themselves the ends and objects of labor.

2d.—A Department of Belles-Lettres will also be included, and will furnish the means of cultivating literary taste and a facility in the graceful use of language, both in speaking and writing, which are as desirable in the engineer and man of science as in the classical student.

3d.—The French and German Languages will form an essential part of the course of instruction, since they are indispensable to the engineer and man of science as the vehicles of a vast amount of information, and also as affording that kind of mental culture which mathematical and physical science, if followed exclusively, would fail to supply.

4th.—The subject of Chemistry and Metallurgy will be thoroughly taught, with all the modern appliances of working laboratories, etc.

The reduction and working of the useful metals will be included in this department, and will be practically illustrated

DESCRIPTION OF BUILDING.

The south and west faces of the building are seen in the plate facing the title, and the rear view, as seen from the northeast, is shown in the plate facing page 8. These will give some idea of the general size and appearance of the edifice, which will be more fully understood when we add that the entire length of the front is 180 feet, depth of main building 44 feet. The depth of the west wing is 60 feet and its width is 30 feet, while the depth of the centre wing or Lecture Hall is 80 feet and its breadth 50 feet.

The main building and west wing have three stories and a basement, while the Lecture Hall has but a single floor. Including halls and stairways, the aggregate floor space is a little (one fifteenth) short of one acre.

A detailed description of the arrangement of the several floors will be the best means of conveying a correct idea as to the character and extent of the various departments.

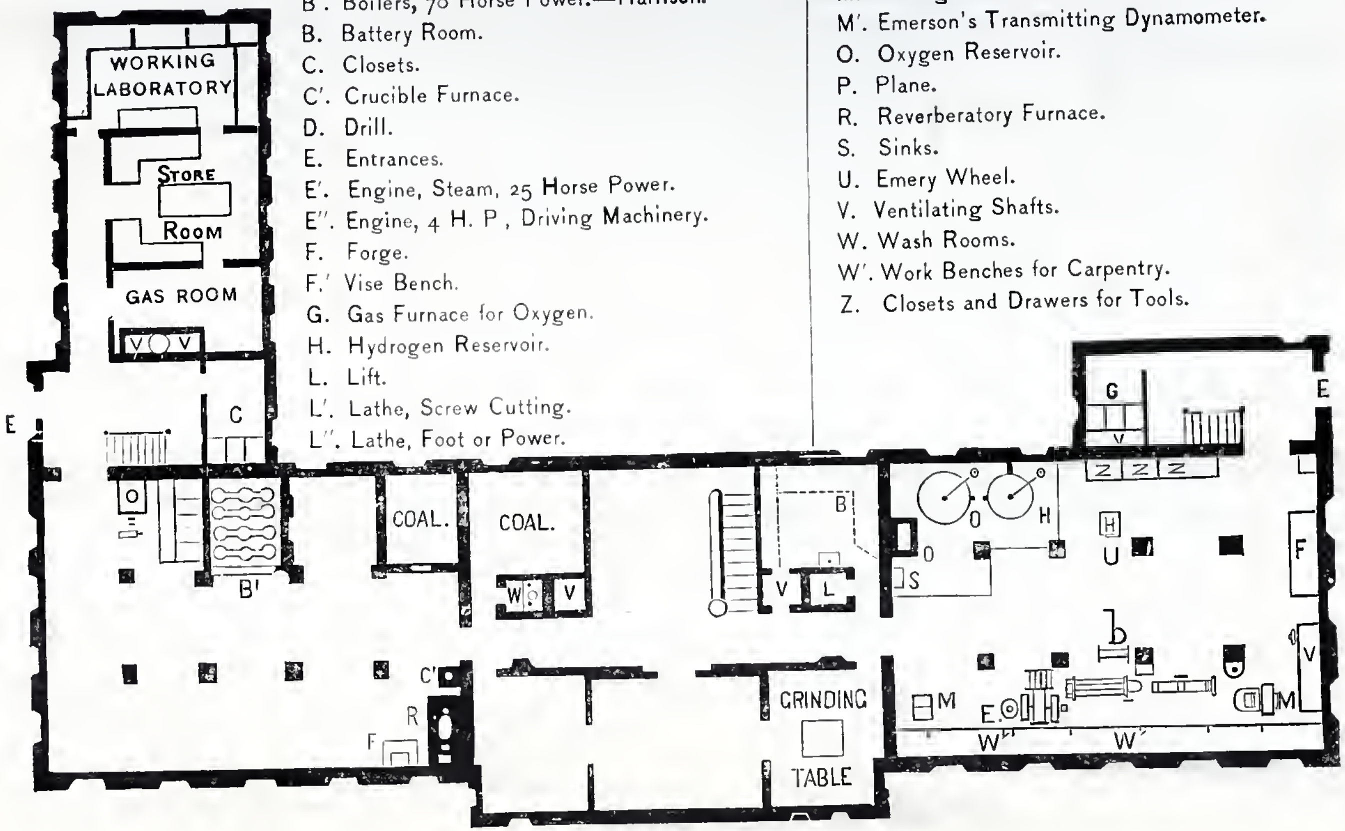
BASEMENT.

Beginning with the basement, on the west or Hudson street side, there are under the wing three rooms assigned to various uses, as shown on the plan, *Plate III.*

Under the main building there is, first, a large room, in which are located the steam boilers, B′ (two Harrison boilers of 35 horse power each), for heating the building and supplying the steam machinery; here also are the various metallurgical furnaces.

Two small rooms give storage for fuel, while another is fitted up for glass grinding, and another, B, is arranged for galvanic batteries, such as those operating the door bells, gongs for recitation hours, and local telegraph passing about the building and to the President's house, as well as the very large battery,

PLATE III.

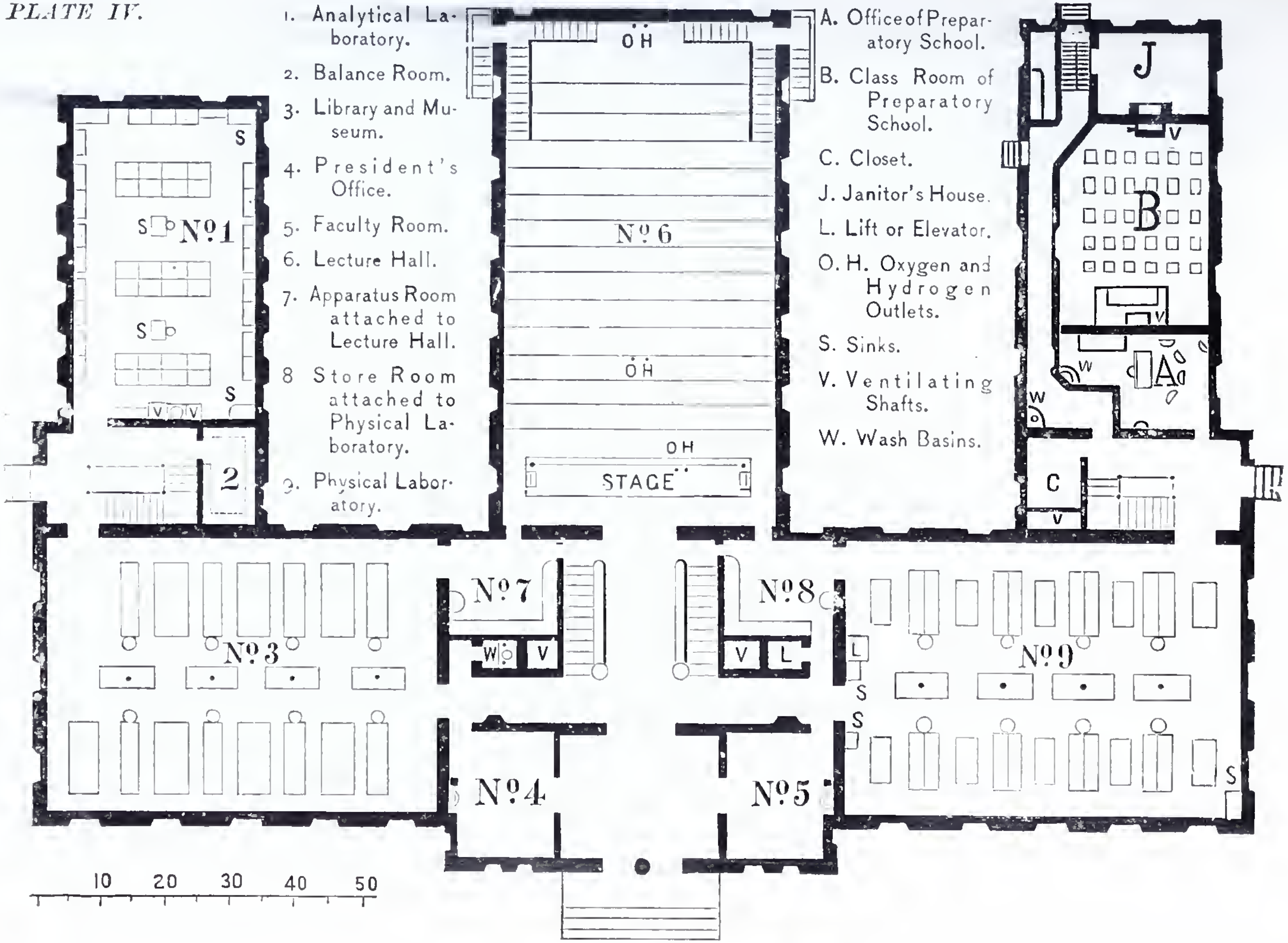


B'. Boilers, 70 Horse Power.—Harrison.
B. Battery Room.
C. Closets.
C'. Crucible Furnace.
D. Drill.
E. Entrances.
E'. Engine, Steam, 25 Horse Power.
E''. Engine, 4 H. P., Driving Machinery.
F. Forge.
F.' Vise Bench.
G. Gas Furnace for Oxygen.
H. Hydrogen Reservoir.
L. Lift.
L'. Lathe, Screw Cutting.
L''. Lathe, Foot or Power.

M. Milling Machine.
M'. Emerson's Transmitting Dynamometer.
O. Oxygen Reservoir.
P. Plane.
R. Reverberatory Furnace.
S. Sinks.
U. Emery Wheel.
V. Ventilating Shafts.
W. Wash Rooms.
W'. Work Benches for Carpentry.
Z. Closets and Drawers for Tools.

BASEMENT.

PLATE IV.



1. Analytical Laboratory.
2. Balance Room.
3. Library and Museum.
4. President's Office.
5. Faculty Room.
6. Lecture Hall.
7. Apparatus Room attached to Lecture Hall.
8 Store Room attached to Physical Laboratory.
9. Physical Laboratory.

A. Office of Preparatory School.
B. Class Room of Preparatory School.
C. Closet.
J. Janitor's House.
L. Lift or Elevator.
O. H. Oxygen and Hydrogen Outlets.
S. Sinks.
V. Ventilating Shafts.
W. Wash Basins.

FIRST FLOOR.

from which heavy conductors are permanently laid to the various lecture rooms.

The large room I, adjoining these, is a machine shop, containing the steam engine E′ and a set of machine tools, including screw-cutting lathe, planer, gear cutter, milling machine, drill, punch, a transmitting dynamometer and hand tools.

At O and H are gas tanks of oxygen and hydrogen, each supplying 100 cubic feet, under a pressure of three quarter pounds to the square inch. From these pipes are laid to all the Lecture Rooms in the building. A small furnace for the manufacture of oxygen is placed at G, and work benches at WW.

FIRST FLOOR.

No. 1.—On the first floor, beginning again at the west side in the wing, we have (*Plate IV*) the chemical laboratory, arranged with tables, and supplied with water, gas, sand baths, drying closets and filter pumps, in the usual manner.

No. 2.—The Balance Room, with a set of fine balances by Becker.

No. 3.—The Library and Model Room, divided by cases into ten alcoves, which contain glass enclosures for large models and instruments, and having reading tables in the middle of the room.

No. 4.—The President's Office.

No. 5.—The Reception Room.

No. 6.—The Lecture Hall, having a stage provided with water, gas, steam, galvanic battery connections, and very efficient means of illumination by oxygen, lime and electric lights, both for general purposes and the especial requirements of experiment.

No. 7.—Small Waiting Room connected with Lecture Room.

No. 8.—Store Room connected with Lecture Room and Physical Laboratory.

No. 9.—Physical Laboratory, divided by cases into ten alcoves, each devoted to some special subject of research, such as—1, Molecular Physics; 2, General Laws of Statics and Dynamics; 3, Hydrostatics and Hydrodynamics; 4, Pneumatics; 5, General Laws of Heat; 6, Special Relations of Heat to Steam; 7, Electrical Measurements; 8, Magnetism; 9, Sources of Electricity; 10, Light. Other departments of the Physical Laboratory have been placed in other rooms, as will be seen further on, and a more complete description of the entire Physical Department will be given subsequently. The east wing of the building, added since last year, contains the office of the Director of the Preparatory School, General School Room, and first floor of Janitor's House.

SECOND FLOOR.

The Chemical Lecture Room is located in the wing, No. 10 (*Plate V*), at the west end. It is provided with a lecture table with pneumatic tank and a wash basin, and also with a glass closet having a downward draught, for escape of fumes. On this table are "laid," also, ordinary gas as well as oxygen and hydrogen under pressure (vacuum) from a Bunsen pump, compressed air from the same, steam and galvanic battery. Adjacent to this Lecture Room is a small store room (No. 10), fitted with closets for the various large pieces of apparatus required in the chemical lectures.

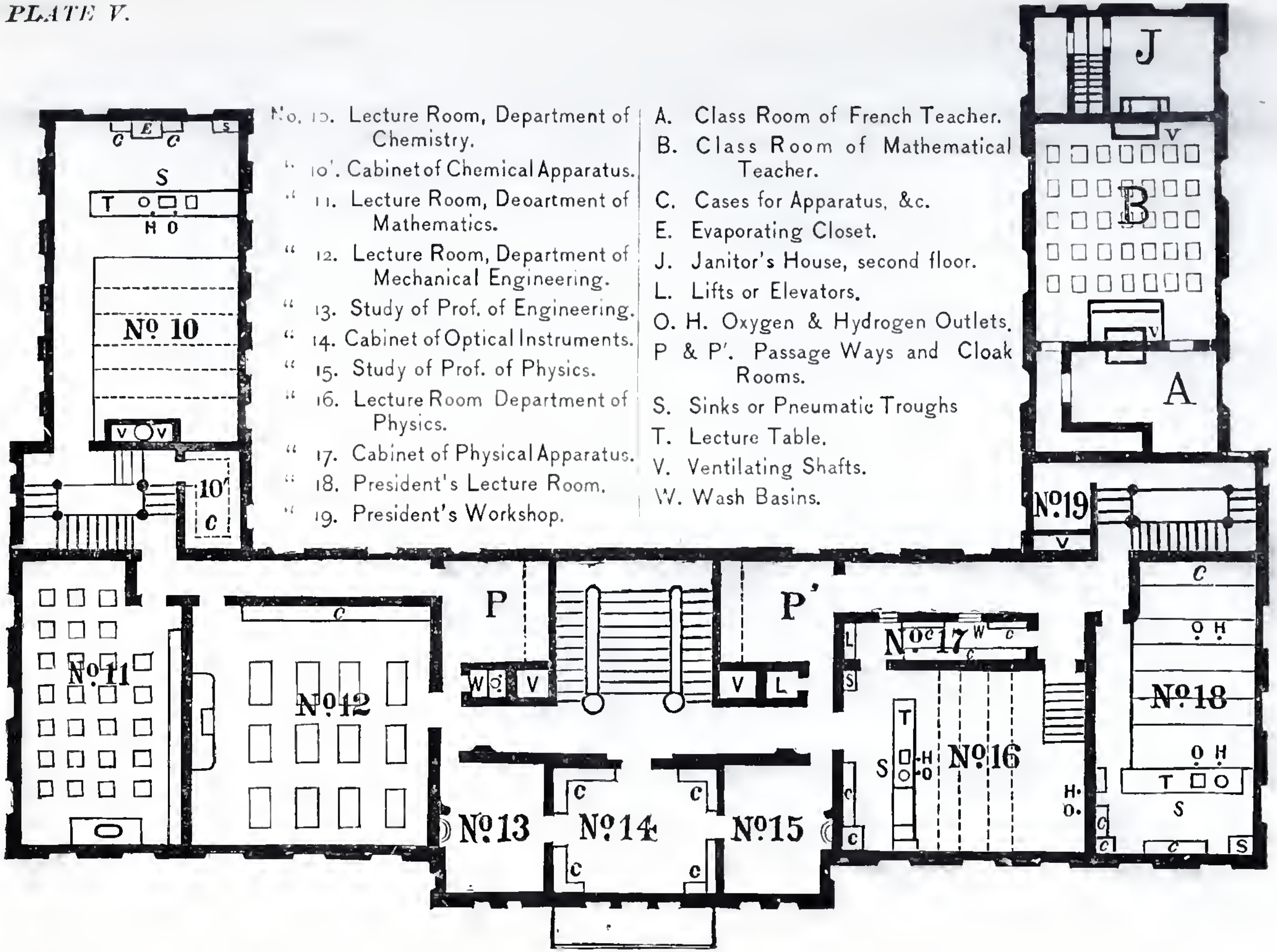
In the main building, next in order, is No. 11, devoted to the Mathematical Department, and fitted up with desks, blackboards, etc.

No. 12 is devoted to Mechanical Engineering, and is supplied with blackboards, tables, cases of models by Schröder, Salleron and others, and a collection of working drawings, and cases containing samples of the materials of engineering constructions, such as stone (natural and artificial), woods, ores, metals, fuels and lubricants.

No. 13.—Private Room or Study of the Professor of Mechanical Engineering.

No. 14.—Museum or Cabinet of Fine Optical Instruments, consisting in the first place of the entire optical collection made by Mr. Bancker, of Philadelphia, said by the Abbe Moigno (see Cosmos, 1859, p. 577) to be "the most numerous and brilliant that exists in the world," and supplemented by a great number of new instruments.

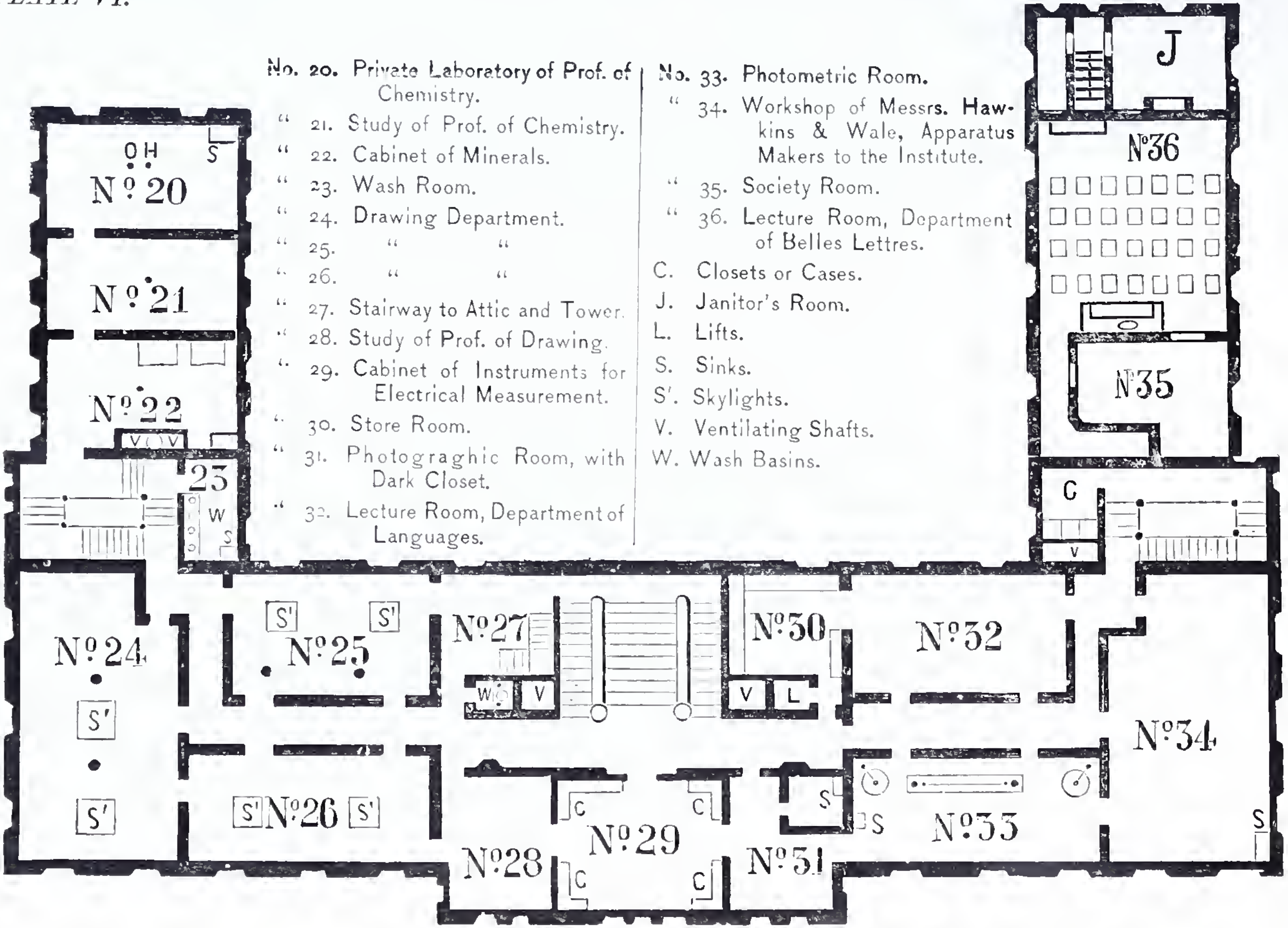
PLATE V.



No. 10. Lecture Room, Department of Chemistry.
" 10′. Cabinet of Chemical Apparatus.
" 11. Lecture Room, Deoartment of Mathematics.
" 12. Lecture Room, Department of Mechanical Engineering.
" 13. Study of Prof. of Engineering.
" 14. Cabinet of Optical Instruments.
" 15. Study of Prof. of Physics.
" 16. Lecture Room Department of Physics.
" 17. Cabinet of Physical Apparatus.
" 18. President's Lecture Room.
" 19. President's Workshop.

A. Class Room of French Teacher.
B. Class Room of Mathematical Teacher.
C. Cases for Apparatus, &c.
E. Evaporating Closet.
J. Janitor's House, second floor.
L. Lifts or Elevators.
O. H. Oxygen & Hydrogen Outlets.
P & P′. Passage Ways and Cloak Rooms.
S. Sinks or Pneumatic Troughs
T. Lecture Table.
V. Ventilating Shafts.
W. Wash Basins.

SECOND FLOOR.



No. 20. Private Laboratory of Prof. of Chemistry.
" 21. Study of Prof. of Chemistry.
" 22. Cabinet of Minerals.
" 23. Wash Room.
" 24. Drawing Department.
" 25. " "
" 26. " "
" 27. Stairway to Attic and Tower.
" 28. Study of Prof. of Drawing.
" 29. Cabinet of Instruments for Electrical Measurement.
" 30. Store Room.
" 31. Photographic Room, with Dark Closet.
" 32. Lecture Room, Department of Languages.
No. 33. Photometric Room.
" 34. Workshop of Messrs. Hawkins & Wale, Apparatus Makers to the Institute.
" 35. Society Room.
" 36. Lecture Room, Department of Belles Lettres.
C. Closets or Cases.
J. Janitor's Room.
L. Lifts.
S. Sinks.
S'. Skylights.
V. Ventilating Shafts.
W. Wash Basins.

THIRD FLOOR.

No. 15.—Private Room or Study of the Professor of Physics.

No. 16.—Lecture Room of the Department of Physics. This is provided with a lecture table, having pneumatic tank and basin, and with ordinary gas (oxygen and hydrogen) under pressure, steam, vacuum, compressed air, and galvanic battery connections; the seats are here arranged on inclined platforms, and there is a screen provided for optical experiments and projections, which can be lowered in front of the case for apparatus at the back of the table. The adjacent room,

No. 17, is furnished with extensive cases for apparatus, and communicates by a special lift or dumb waiter with the Physical Laboratory below.

No. 18 is also a Lecture Room, fitted up in all respects like the preceding, and used by the President for his lectures in the Department of Physics, and for his individual researches.

No. 19 is a small workshop attached to the preceding, and containing a lathe and file bench.

The east wing on this floor contains Class Room of French Teacher, Class Room of Teacher of Mathematics, and another floor of Janitor's House.

THIRD FLOOR.

Beginning again at the extremity of the west wing *(Plate VI):*

No. 20 is a Laboratory devoted to the individual use of the Professor of Chemistry.

No. 21 is his Study and Library.

No. 22 contains the Cabinet of Minerals, and is fitted up for examination of new specimens.

No. 23 is the Wash Room.

Nos. 24, 25, 26 are assigned to the Department of Drawing.

No. 27 contains the Stairway to the Tower.

No. 28 is the Study of the Professor of Drawing.

No. 29 is devoted to Electrical Measurement, and is supplied with a complete outfit of the most delicate instruments for this purpose, by Elliott & Bros., of London.

No. 30.—Store Room.

No. 31.—To Photography, with dark closet, washing trough, etc., etc.

No. 32 is assigned to the Department of Languages.

No. 33.—To Photometry, with a full set of apparatus by Sugg, of London.

No. 34.—Workshop of Messrs. Hawkins & Wale.

The east wing on this floor contains :

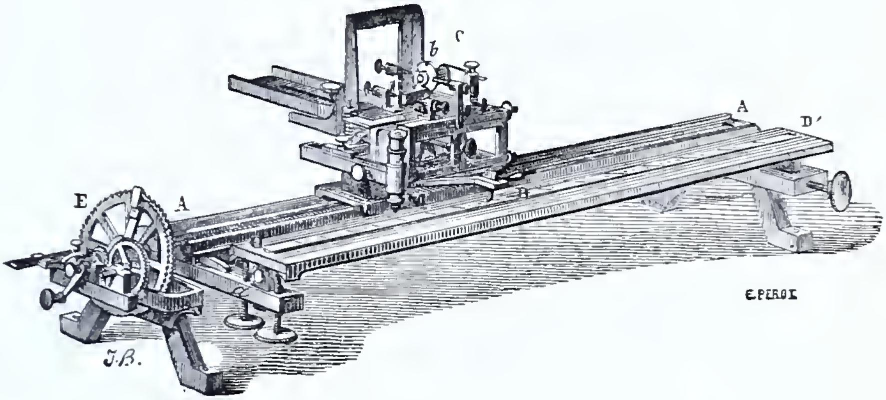
No. 35.—Society Room.

No. 36.—Lecture Room of the Department of Belles-Lettres.

No. 37.—Janitor's Apartments.

COLLECTIONS.

DEPARTMENT OF PHYSICS.



Dividing Engine. By J. Salleron.

The Collections of the Institute are so extensive that it is difficult, without occupying too much space, to make any detailed enumeration of them, but they may be described in classes, as follows:

APPARATUS FOR PRECISE MEASUREMENTS.

LINEAR MEASURE.

Linear Dividing Engine, of large size, dividing to millimetres, and Calibrating Engine, from Salleron, Paris.

Dividing Engine, by Hawkins & Wale, dividing two feet to $\frac{1}{1000}$ of an inch.

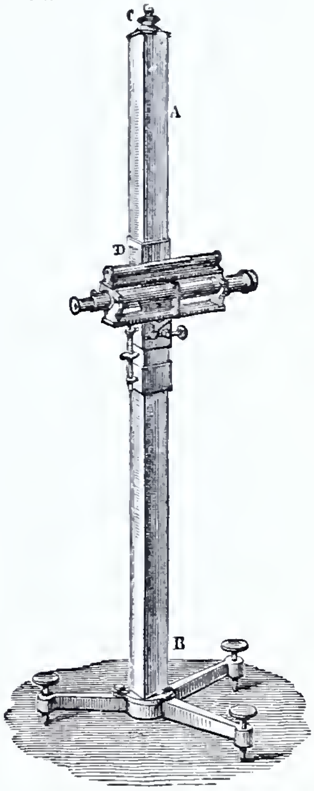
Spherometer, by Duboscq, of Paris.

Kater's reversion pendulum.

Set of Brown & Sharp Scales, Squares, Gauges, Micrometer Screw, etc.

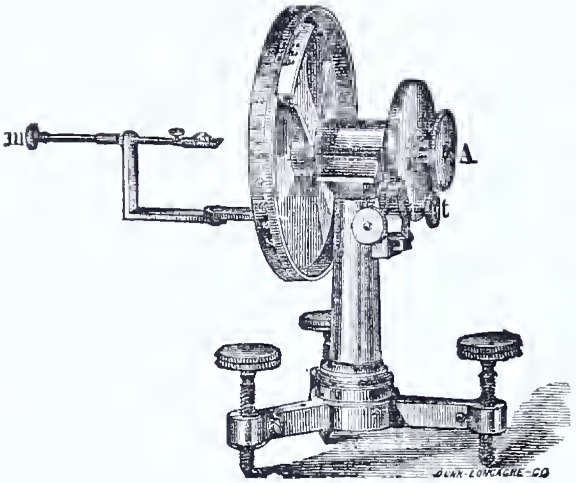
Saxton's Reflecting Comparator.

Comparator of Yard and Meter, of new form, constructed in the Coast Survey Office, under the direction of Prof. J. E. Hilgard, and provided with every refinement of adjustment.



Cathetometer. By J. Salleron.

MEASUREMENT OF ANGLES.



A Theodolite, a Wollaston's reflecting goniometer, a Babinet's reflecting goniometer and a large reflecting goniometer by Elliott.

MEASUREMENT OF CAPACITIES.

Graduated vessels of various volumes, and divided into various measures, such as a litre, 500, 100 and 50 cubic centimetres, gallon, quarts, pints, ounces and cubic inches.

MEASUREMENT OF WEIGHTS.

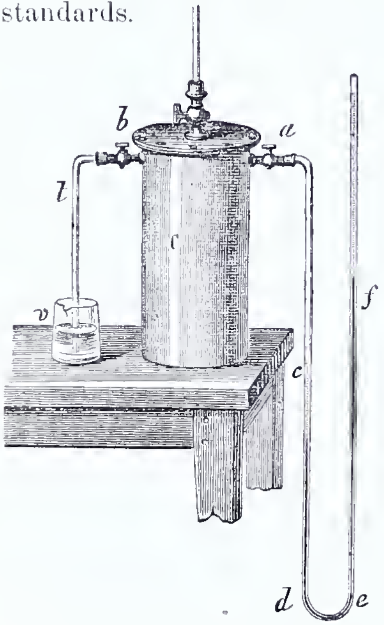
Standard balance, thirty inch beam, carrying five kilogrammes in each pan, turning with one milligramme, and sets of accurately adjusted weights for both French and English standards.

MEASUREMENT OF TIME.

Chronoscope from Hipp, of Neufchatel; also, electric chronograph from the same maker, and recording chronograph of Casella.

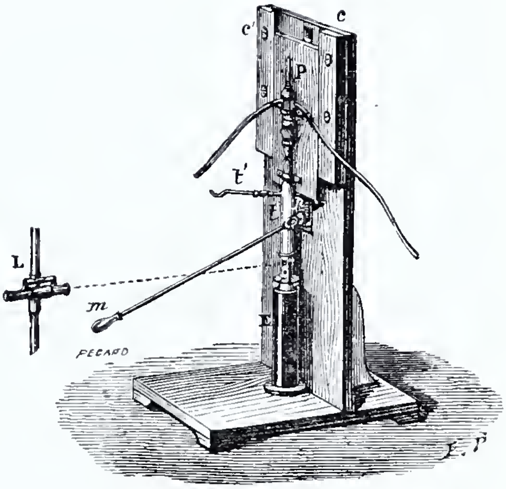
MOLECULAR PHYSICS.

The various forms of apparatus for illustration of cohesion, capillarity, &c., devised by Simon, Béclard, Graham, Bunsen and others, including Plateau's apparatus for the study of liquids freed from the action of gravity, and the various forms of diffusion apparatus devised by Graham and others. Also, instruments for measurement of elasticity in solids, the effects of torsional and other strains.



Apparatus of Simon (de Metz). By Salleron.

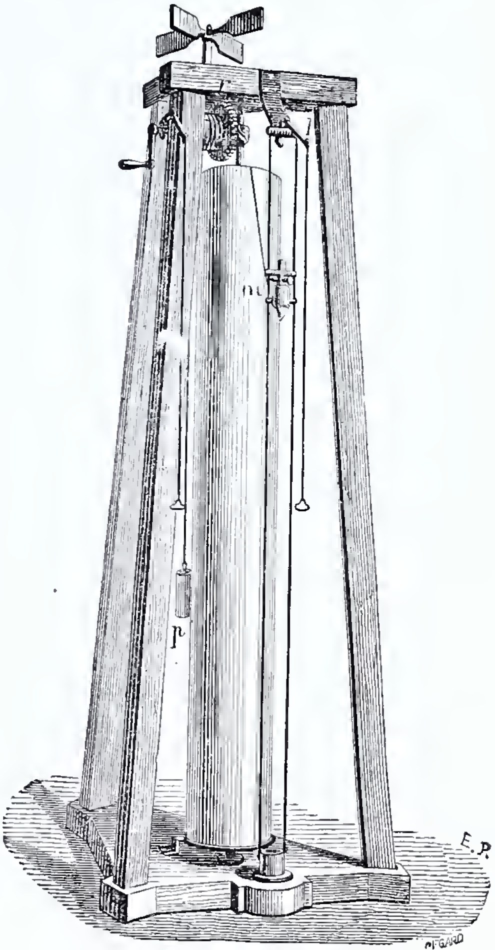
These instruments are exact duplicates of those used in the original investigations of the physicists by whom they were devised, and enable the student to verify for himself the important laws which they have been employed to evolve. It is hardly necessary to say how valuable such a mode of study proves in fixing permanently in the mind the laws and facts concerned.



Diffusometer of Bunsen. By J. Salleron.

ELEMENTARY MECHANICS.

All the apparatus which has been devised for the illustration of mechanical laws, such as the Attwood machine and that of General Morin; the whirling table; sets of mechanical powers; also, suspended ivory balls (several sets of different mass and with various attachments, illustrating different points); illustrations of hydrostatics, hydrodynamics, and pneumatics; including, beside all the simpler apparatus, several air pumps of the most improved construction; working models of the hydraulic ram, hydrostatic press, water wheels, pumps, steam engine, and a Natterer's pump, for liquefying gases, made by E. S. Ritchie.



Gen. Morin's Apparatus. By J. Salleron.

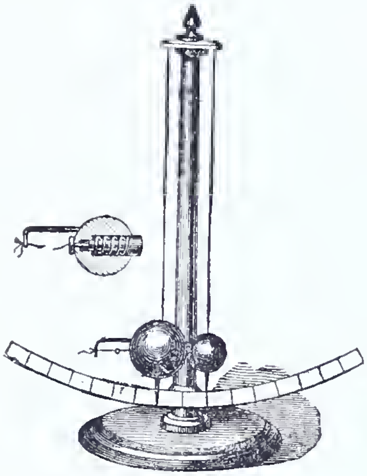


Illustration of Momentum.
By E. S. Ritchie.

Also various forms of barometer, such as the barometer of Fortin, two forms of aneroid barometer by Casella, various gauges and manometers by Salleron, Green, Ritchie and others.

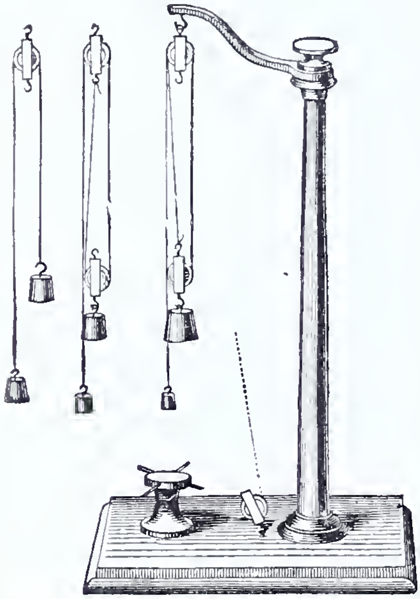
Illustrations of specific gravity of liquids, such as those of Babinet and Boyle, together with hydrometers, areometers, salinometers, etc., of every form.

Among the illustrations of mechanical principles it may be well to name:

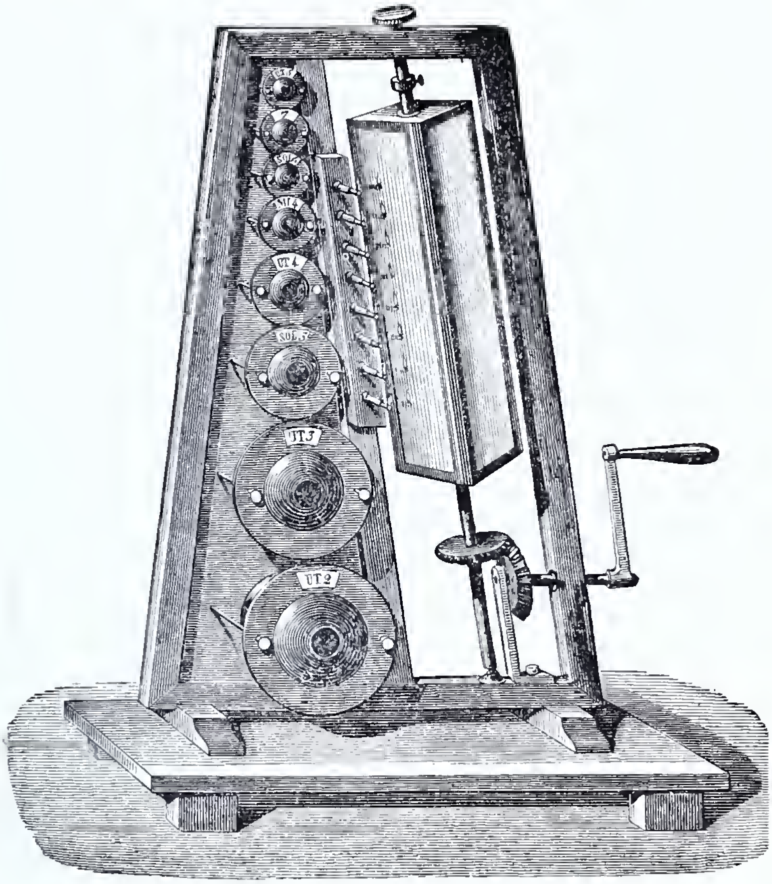
The cycloidal pendulum, compensating pendulum, pendulum of Foucault; and various forms of escapement, as that of Graham, of Lepaute, the cylinder escapement, and that of Arnold.

Foucault's pendulum apparatus, cycloidal and other curves, for falling bodies, whirling tables, Charles' apparatus to develope the laws of the flow of liquids, Hiero's fountain; Barker's mill, aspirators, &c.

In this connection should also be mentioned Bourdon's apparatus, consisting of air chambers, with manometers, air gun, etc., to illustrate the laws of *vis-viva*. This division contains about 100 complete instruments or sets of illustrations, such as those included under the title Mechanical Powers, Whirling Machine, or Centre of Gravity Illustrations.



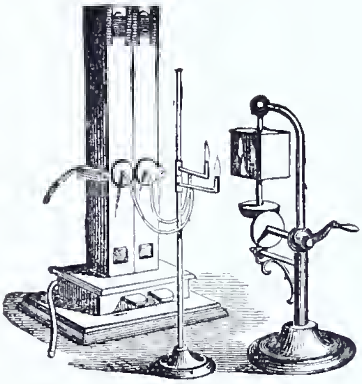
Models of Pulleys. By E. S. Ritchie.



Resonators and Manometric Flames. From R. Koenig.

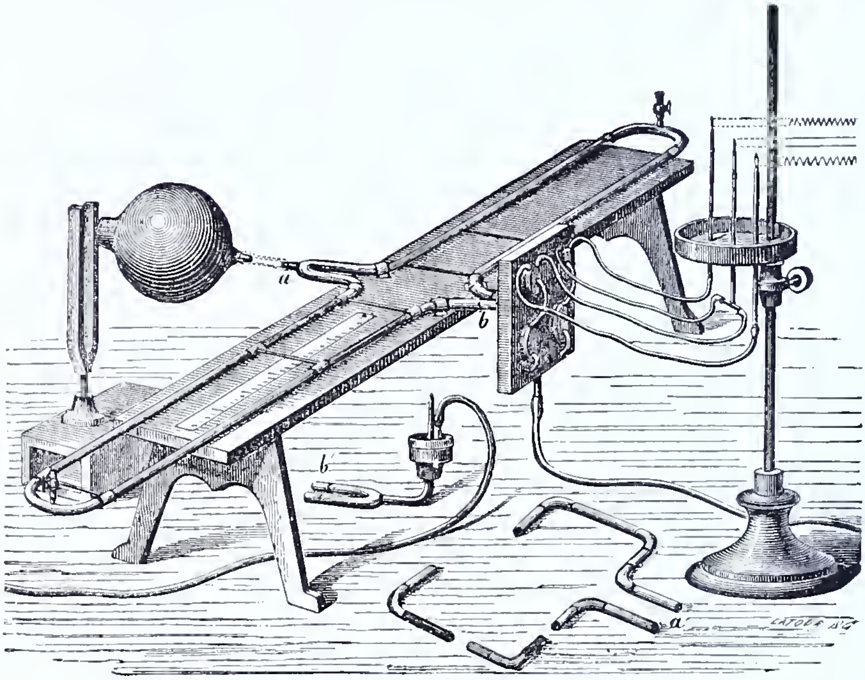
ACOUSTICS.

The apparatus in this division includes as one item the entire collection on this subject of the late Charles N. Bancker, of Philadelphia, and numbers among its objects numerous sets of organ pipes and tuning forks, of every material, adapted to illustrate the various laws of sound, and also sonometers, sirens, resonators, vibrating rods of various material, Schaffgotsch's apparatus, manometric flame apparatus, Scott's phonautograph, and, in fact, an unusually complete collection of every appliance that can be made useful in the illustration or study of the subject of Acoustics. As an illustration, we would specify more fully two examples, as follows:



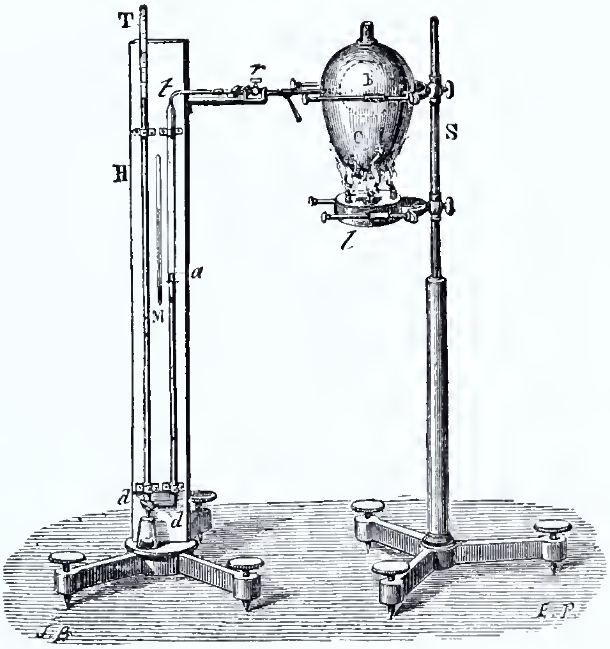
Organ Pipes, with Manometric Flames. From R. Koenig.

Organ pipes, with Kœnig's manometric flames, for studying the vibrations of the air in the interior of the pipes. Circular holes are cut in the sides of the pipes at the nodal and ventral points, and these holes are closed by their membranes. Over these membranes are placed wooden capsules, into which illuminating gas enters by one tube and issues by another; the latter tube terminates in a small gas jet. This jet will jump up and down as the membrane with which it is connected moves outwards or inwards; and if the vibrating flame be viewed in a revolving mirror it will appear as a series of teeth, formed by the rising and falling of the flame.



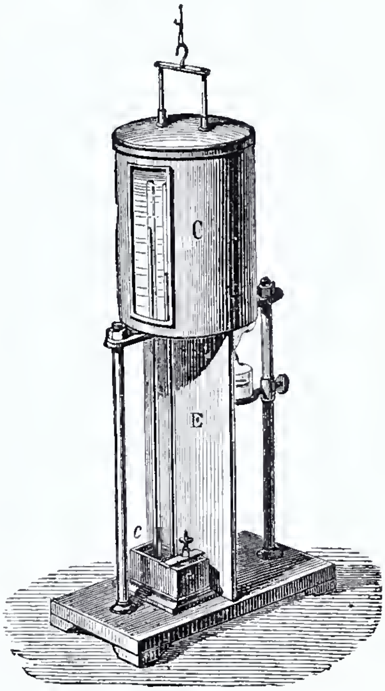
Quincke's Apparatus for Measuring Wave Lengths. From R. Koenig.

The apparatus for measuring wave lengths, in which the measure is made by causing one half of a given sound to traverse one branch of a forked tube while the other half of the sound traverses the other branch of the forked tube. When one of these branches is longer than the other by one half of a wave length, then the sonorous pulses which meet at the confluence of these branches will oppose each other, and a manometric flame placed at that point will appear at rest when viewed in a revolving mirror.



Regnault's Apparatus for Dilatation of Gases. From J. Salleron.

HEAT.



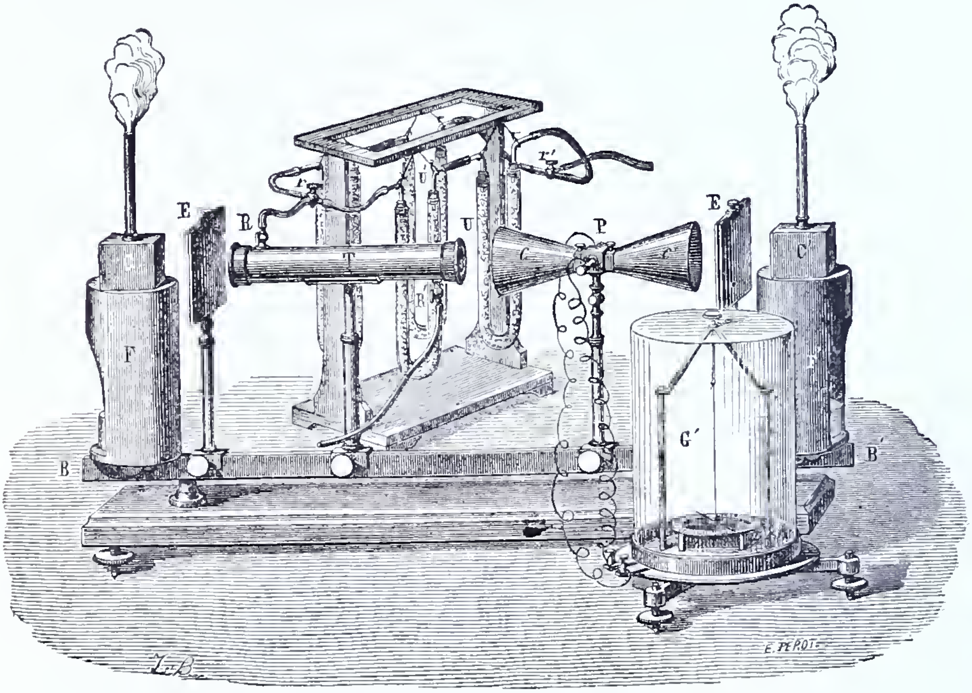
Regnault's Apparatus for Tension of Vapors. From J. Salleron.

On account of the important bearing which this subject has on the professional work of the mechanical engineer, particular attention has been given to the completeness of this part of the collection, which comprises, in addition to all the usual instruments fitted for illustration before a class, all the instruments of precision by which accurate measurements of specific and latent heat of solids, liquids or gases may be made, as well as the relations between tension and temperature of vapor, the coefficients of expansion in all forms of matter and the like. This part of the collection, in fact, includes all the instruments used in the classical researches of Dalton, Gay-Lussac, Dumas and Regnault. Also, Ramsden's apparatus for determining the coefficient of dilatation of solids, that of Dulong & Petit for the dilatation of mercury, the apparatus of Pierre for determining the corresponding coefficient of liquids, and the like.

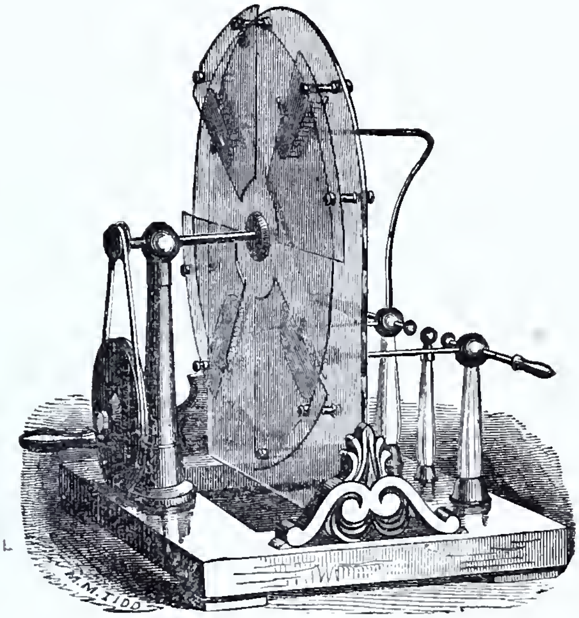
Here, also, will be found fine standard thermometers of every description and adapted to every use, varying in range and in minuteness of gradation to suit all requirements of experimentation.

Thus we may enumerate thermometers by Casella reading to $\frac{1}{10}$ of a degree Centigrade, and running from 30° C. to 320° C. in a series of instruments. Numerous forms of registering or maxima and minima thermometers, such as those of Walferdin, Negretti and Zambra, Casella and others, Breguets metallic thermometer, the solar thermometer, the pyrheliometer, etc., etc. Also, all apparatus for making and graduating thermometers.

A complete set of Melloni's apparatus for study of radiant heat, with Tyndall's additions, is also found here.



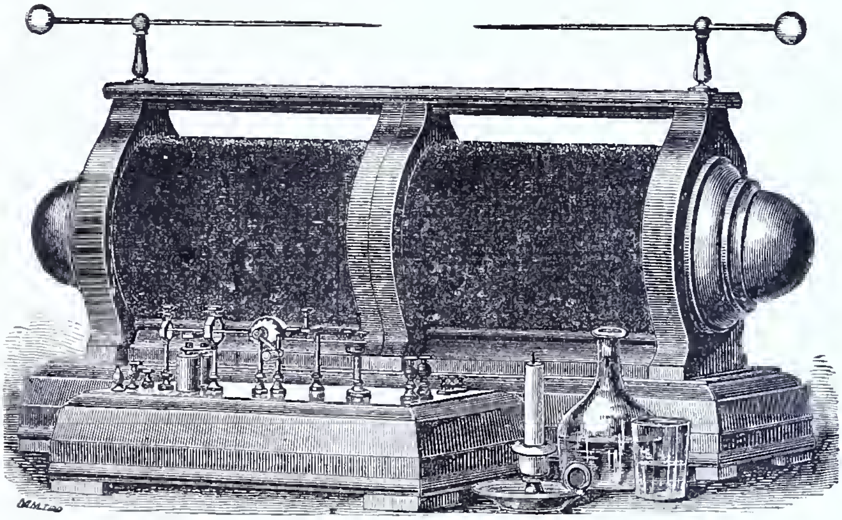
Melloni-Tyndall Apparatus. From J. Salleron.



Holtz Machine. By E. S. Ritchie.

ELECTRICITY.

Under this head are included a complete series of instruments for class exhibition, as well as those for accurate measurements and investigation. Thus, in the first class are to be found the ordinary electrical machine, with all its attendant apparatus of Leyden jars, electroscopes, electrometers, bells, orreries and the like; the Holtz machine, with various interchangeable plates and sectors, by means of which it can be combined in various ways so as to exhibit all the modifications and improvements which have from time to time been introduced in its form or construction by its inventor, and by Bertsch, Carre, Ritchie, Van Brunt, Poggendorff and others. Also, various forms of the electrophorus, the condenser of Epinus, and various instruments to illustrate the theory of induction, so important in its relations to submarine telegraphy as well as in other subjects.



Induction Coil. By E. S. Ritchie.

Three induction coils provide abundant means for illustration or research in cases where electricity of high tension is required. The largest of these contains fifty miles of fine wire in its secondary helix, throws a spark of twenty-one inches in the air, and pierces blocks of glass three inches thick.

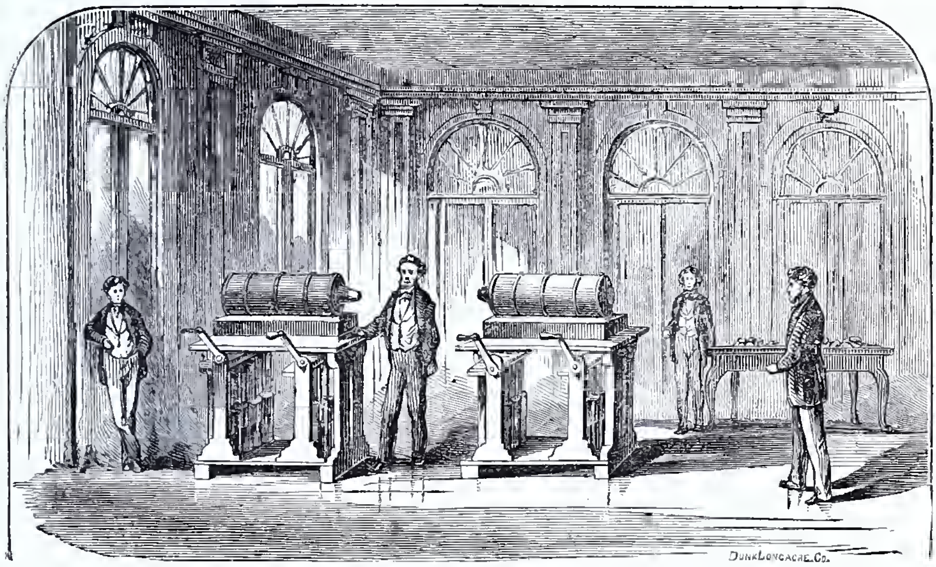
The second coil is one of Ritchie's upright form, and throws a spark of seven inches in the air.

The third is of French manufacture, of the horizontal pattern, 8 × 15 inches on the base.

A very extensive collection of Geissler tubes, including large globes filled with rarefied gases, to illustrate stratification in the electric discharge, numerous jacketed spirals, for fluorescent liquids, large phosphorescent "garland" tubes, others containing solid phosphori "spectrum tubes," and others, numbering many hundreds in all, with various special pieces of apparatus, serve with these instruments to illustrate all the characteristics of electric discharge, etc.

A Grove battery of sixty couples, also a Bunsen battery of sixty couples, for the electric light; another series of four immersion batteries, each equal to fifteen Bunsen couples, of more than a foot surface ; a water battery of 550 cells; another water battery of 5,000 cells, and several other batteries for special purposes, such as a small immersion Smee battery of twenty cells, for electrical measurements, a Grove battery of twelve cells, a large Smee of eleven cells, a modified Daniell of seven cells, and many single cells, of the flask and other forms, afford an abundant supply of electric force for all purposes.

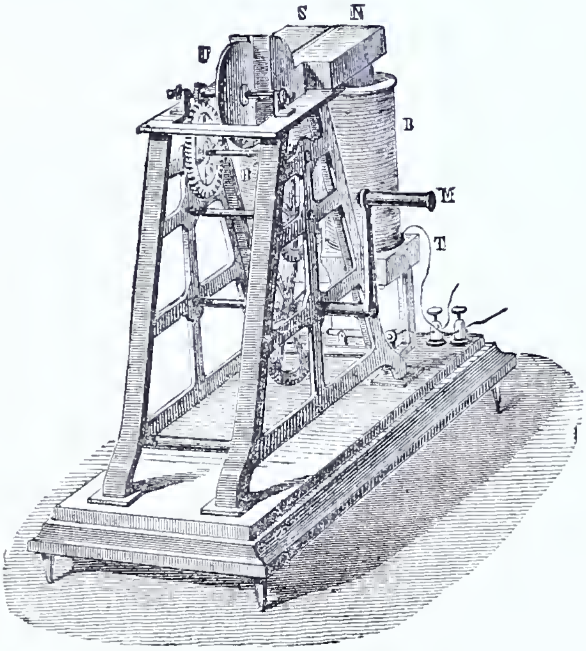
The largest electro-magnet yet constructed, weighing nearly a ton, containing in its eight spools some two thousand feet of wire, one fifth of an inch in diameter, and provided with all the attachments for experiments in Diamagnetism, should be included here. With this instrument a number of outstanding problems in magnetism have been already solved, and its great power and efficiency will render it a valuable means of investigation in the future. It is so arranged as to be either used as represented in the wood cut, for illustration, or combined into other forms for experiments.


DunkLongacre.Co.

Electro-Magnet, weighing 1,600 lbs. By Wm. Wallace & Sons.

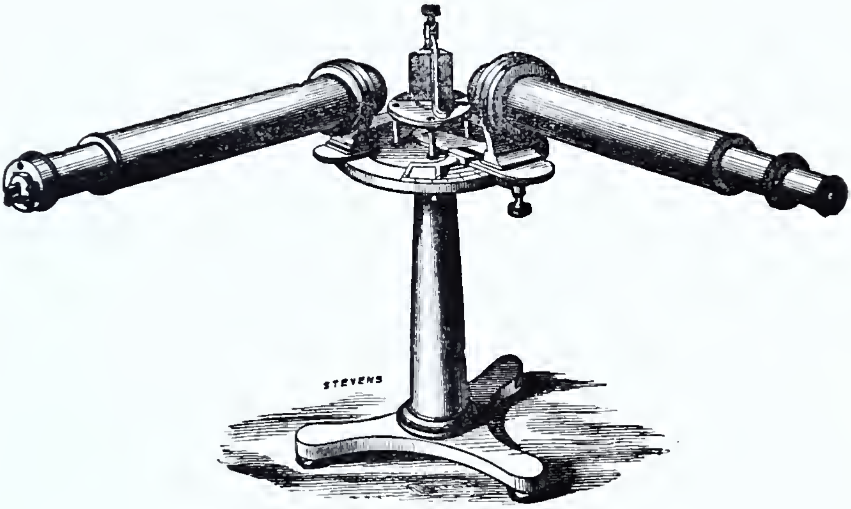
Among the instruments for electrical measurement we may enumerate, as supplied by Elliott & Co., of London, a Thomson's double coil astatic galvanometer, with shunts (this is the instrument used on the Atlantic and other ocean cables); a Thomson's single coil, low resistance galvanometer, with shunts, lamp, scale, etc.; a set of resistance coils, with bridge; a tangent galvanometer, with two conical coils (modification of Gaugan's); Wheatstone's bridge; Poggendorff's rheocord; Wheatstone's rheostat; astatic galvanometer; thermo-electric pile; quadrant electrometer, with key; condenser of microfarads; spiral induction coils; differential induction coils; Dubois Reymond's induction coil; Delezenne's ring, for developing galvanic current from the earth's magnetism; also, another instrument of the same sort, two and a half feet in diameter, for class illustration.

Also, from Chester, of New York, a set of resistance coils, bridge and galvanometer in the same case, small galvanometer, commutator, &c.



Foucault's Apparatus. By J. Salleron.

A large collection of magnetic engines and instruments, for illustrating the relations of currents and magnets, which have been developed by Ampere, De la Rive, Faraday and others, is also to be found in this portion of the cabinet.

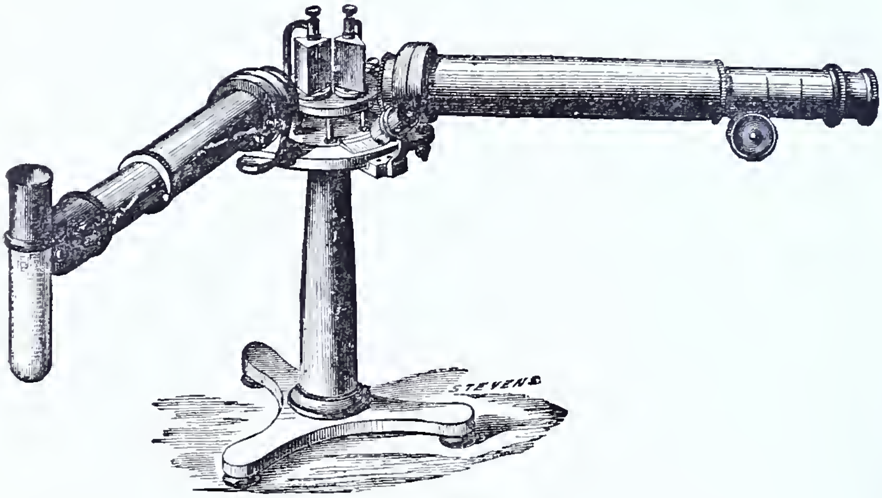


Single Prism Spectroscope. By J. Browning.

OPTICS.

The Institute's Cabinet of Optical Apparatus is the most complete in the country. It contains, as one item, the instruments continuously collected during the past fifty years by the late Chas. N. Bancker, of Philadelphia, which has been long known to men of science as the most extensive museum of optical instruments existing in any part of the world. The Abbé Moigno said of it, in the "Cosmos," that "it embraced more riches than all our cabinets of France, and perhaps of Europe, united;" and this, with the additions made to it since its purchase, forms a collection illustrating the whole progress of optical discovery.

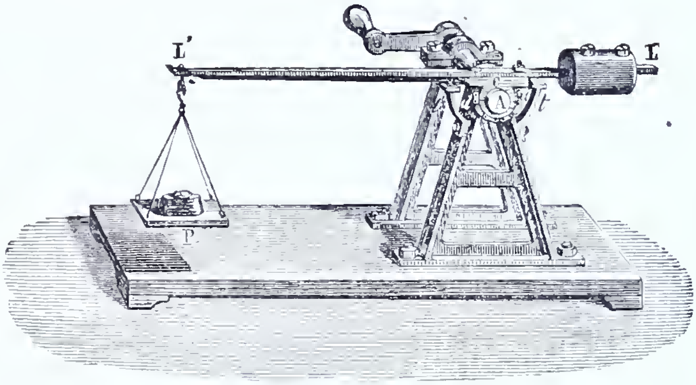
In this department are found all the aids necessary either for class illustrations of optical phenomena or for the prosecution of higher studies. Thus, there are here included electric and oxyhydrogen lanterns of various forms, fitted for the various requirements of projection, such as a large lantern with eight inch condensers for drawings, and other large objects—two with five inch condensers, with vertical attachment, two with four and a half inch condensers, for use in different lecture rooms, one for polarized light, one for the gas microscope, one for spectrum projections with lime light, and one for the same with the electric light; porte-lumieres and heliostats, for the introduction or direction of pencils of light to be experimented with; apparatus for illustrating the laws of reflection; prisms of all kinds of glass, quartz, fluor spar, calc-spar, amber and rock salt, as well as hollow prisms and prismatic troughs for liquids, for the measure of the indices of refraction of these substances, and for the study of the various spectra which they give. Also, the goniometer of Babinet, and another fine instrument constructed by Elliott, of London, which is so arranged that it serves for determining an index of refraction for the mapping of spectra, and for the measuring of the wave lengths of the various colored rays of light, by angular measures on diffraction spectra, produced by fine lines closely ruled on glass plates. To aid in similar work the Institute possesses three spectroscopes—two by Browning and one by Desaga. In the collection are reflecting and refracting telescopes of every system; an excellent Zentmayer microscope, provided with all the accessories of Smith & Beck for mounting objects; a superior $\frac{1}{12}$ objective, by Powell & Lealand, and numerous microscopic objects, including a superb Müller diatomacean type plate.



Two Prism Spectroscope. By J. Browning.

Becquerel's phosphoroscope, and all of Stokes' apparatus for the study of fluorescence, including prisms, lenses and tanks of quartz, a lens of fluor spar, large blocks of uranium glass, and a very complete collection of fluorescent solids and liquids, furnish peculiar facilities for the exhibition and study of these interesting phenomena.

The instruments for elucidating the phenomena and laws of the diffraction, the interference and the polarization of light, are so numerous that we can only particularly mention a few of them—as the diffraction bench of Dubosq, and another of Babinet; a superb interferential refractometer of Fresnel and Arago, for measuring indices of refraction of gases by the displacement of the interference bands produced by two pencils of light, one of which has passed through air, the other through the gas whose index we would determine. Among the apparatus for the study of polarized light there are polariscopes of Noremberg, of Amici, of Airy and of Dove—accompanied with complete collections of crystal sections; Biot's large apparatus for studying rotatory polarization, and Soleil's saccharimeter, which applies the above phenomena to the analyses of cane and grape sugars. The collection also contains a series of optical drawings and models, among which we may mention models of Fresnel's wave surface, as developed by Hamilton; with Lloyd's and Beers' apparatus for showing the remarkable phenomena of conical and cylindrical refraction, of which Hamilton's model shows the theoretic prediction. Some notion of the completeness of this collection can be formed from the fact that it contains thirty-four complete instruments for the study and application of polarized light alone.

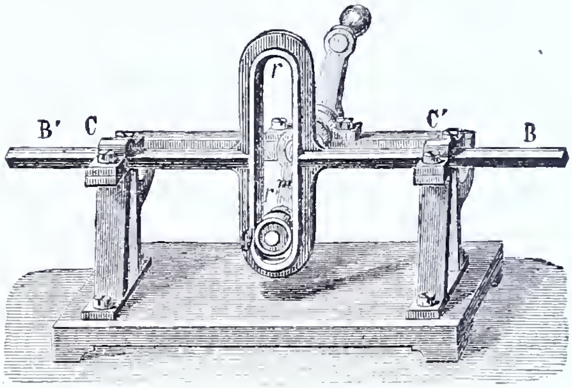


Prony's Dynanometer. By J. Salleron.

COLLECTIONS IN THE DEPARTMENT OF ENGINEERING.

The collections of drawings, apparatus and models in the Department of Mechanical Engineering, which are already quite extensive, are continually being enlarged, both by purchase and by contributions from manufacturers, engineers and other friends of the Institute.

Among the drawings are complete sets representing the hulls and engines of steam vessels, locomotive and stationary engines, and machinery of various kinds.

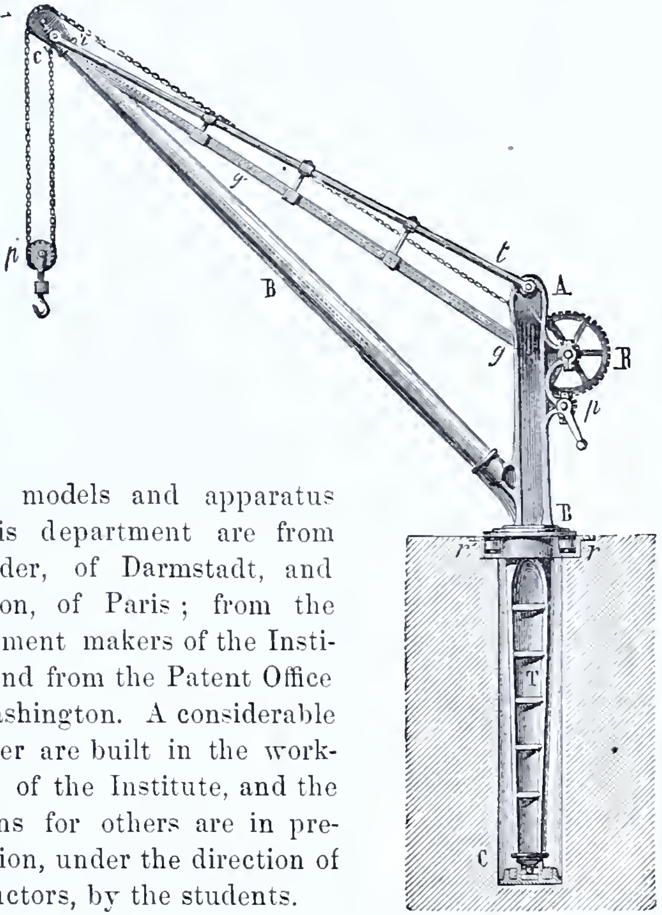


Model of Slotted Cross Head. By J. Salleron.

Each set comprises elevations and plans of the machines complete, and all of the working drawings of details which are required in the workshop.

The larger proportion are manuscript drawings, made for actual construction in the drawing rooms of their designers; some are the product of the labor of the students, and others are lithographed drawings, obtained by purchase at home and abroad.

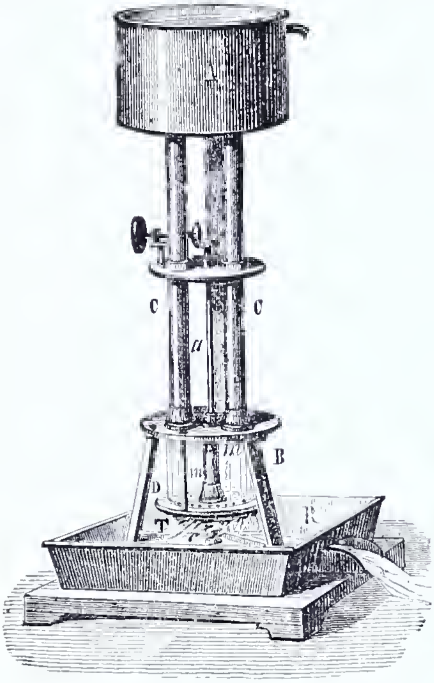
The models and apparatus of this department are from Schröder, of Darmstadt, and Salleron, of Paris; from the instrument makers of the Institute and from the Patent Office at Washington. A considerable number are built in the workshops of the Institute, and the designs for others are in preparation, under the direction of instructors, by the students.



Model of Jib Crane. By J. Salleron.

Some specimens are of great interest historically, as well as valuable representations of peculiar forms of machines or of mechanical movements.

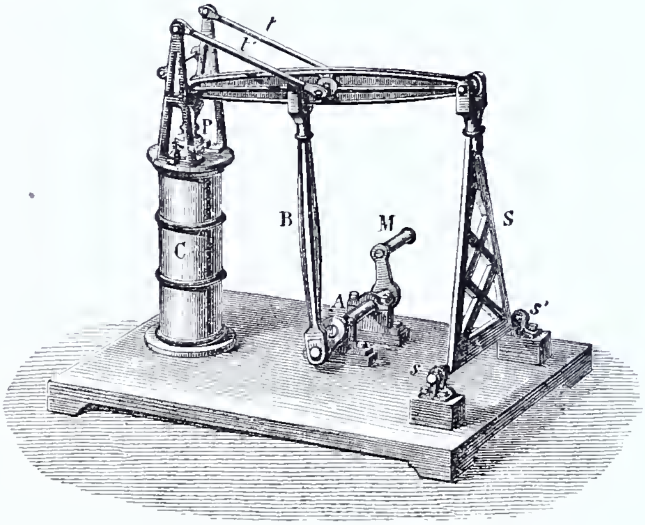
Many of the most valuable have been contributed by manufacturers, and exhibit the designs of the various machines as now made by the best known firms in the country.



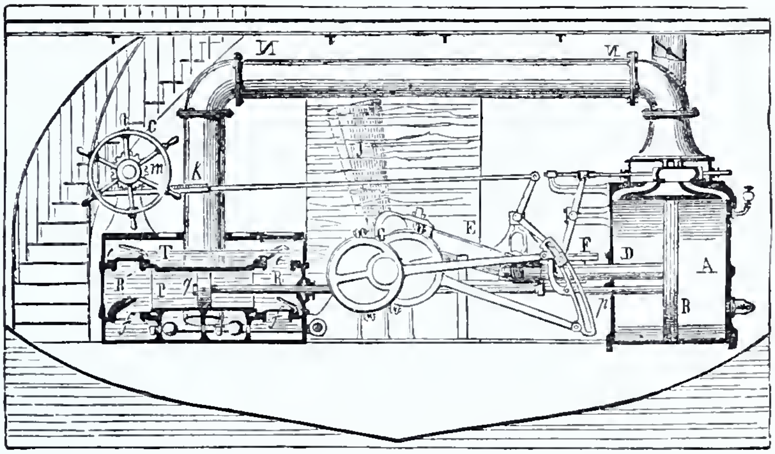
Fontaine Turbine. By J. Salleron.

The sketches of the Prony dynamometer, and other machines presented on the preceding pages, and of the beautiful model of the Fontaine Turbine, and of the steam engine of Oliver Evans, here shown, give a good idea of the value of such apparatus in presenting to the student, in the most effective manner, the typical classes of machines.

The list of models of steam boilers, of engines and of their details, is unusually complete, and the models of gearing and of simple machines are also numerous.



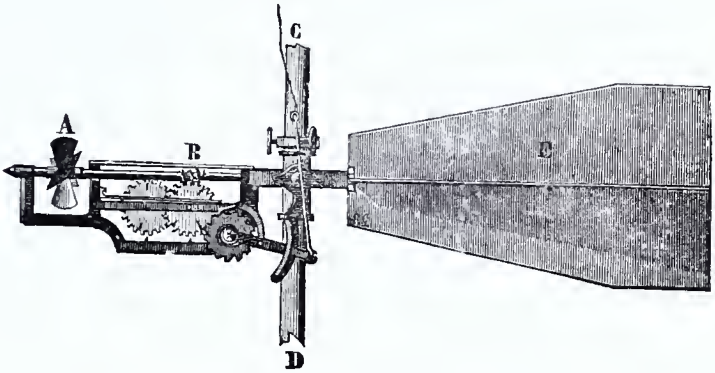
Oliver Evans' Engine and Parallel Motion. By J. Salleron.



Sectional Model of a Marine Engine. By J. Salleron.

There is a full illustrative set, to accompany the regular course, of models of trusses and bridges; of the elements of machines, such as cams, gearing and cranks, and other methods of transmitting and modifying motion; of simple machines, as pumps, windlasses and pulleys; of motors, as wind mills, water wheels of various kinds, air, gas and steam engines.

Several of Salleron's sectional models, of which one is exhibited in the above cut, are among the last named, and are found to be of great value in teaching the student the nomenclature and functions of the various parts of the steam engine, in tracing the causes of derangement, and in exhibiting the method of repairing injuries.



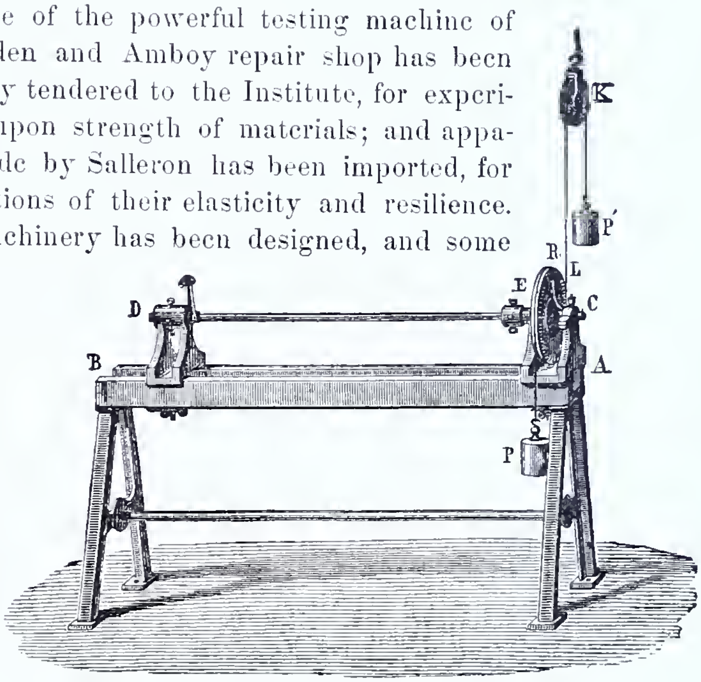
Baumgarten's Velocimeter. J. Salleron.

It is intended to make the collection of models of Steam Machinery very full and complete. It will include historical models, exhibiting the successive improvements, from the "Ælopile" of Hero (250 B. C.) to the most modern form of the steam engine; it will also include *sectional* models of the principal of the common types of both engine and boiler, and representations of the usual modifications of their more important parts and appurtenances.

Orders are still outstanding for considerable additions to the collection; and the workshops of the Institute, while enabling the student to become practically acquainted with working machinery, will also, by adding to the collection of models, be very useful to the College.

The department possesses, and is collecting samples of the various kinds of woods, stones and metals employed in the arts, in their various stages of preparation for use; of the commercial lubricating oils, and of other materials, with the properties of which the engineer is expected to be familiar.

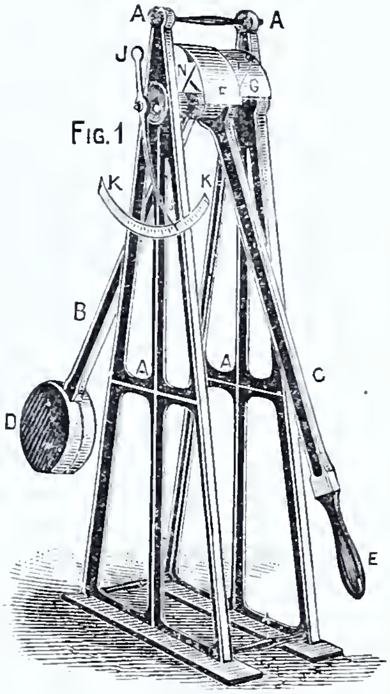
The use of the powerful testing machine of the Camden and Amboy repair shop has been generously tendered to the Institute, for experimenting upon strength of materials; and apparatus made by Salleron has been imported, for investigations of their elasticity and resilience. Other machinery has been designed, and some



Wertheim's Torsion Apparatus. By J. Salleron.

apparatus has been built by the Institute, with which to make unusually accurate and extended researches in this important field. A sketch of one of these machines is here given.

FIG. 1



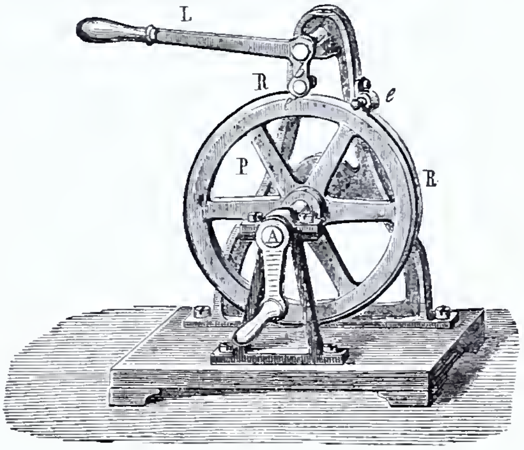
Thurston's Torsion Apparatus, with Automatic Registry. By Hawkins & Wale'

For determining the resistance of machines and the power of prime movers the Prony Dynanometrical Brake, the Recording Spring Dynamometer, Emerson's Portable Lever Dynamometer, and a number of Steam Engine Indicators have been obtained.

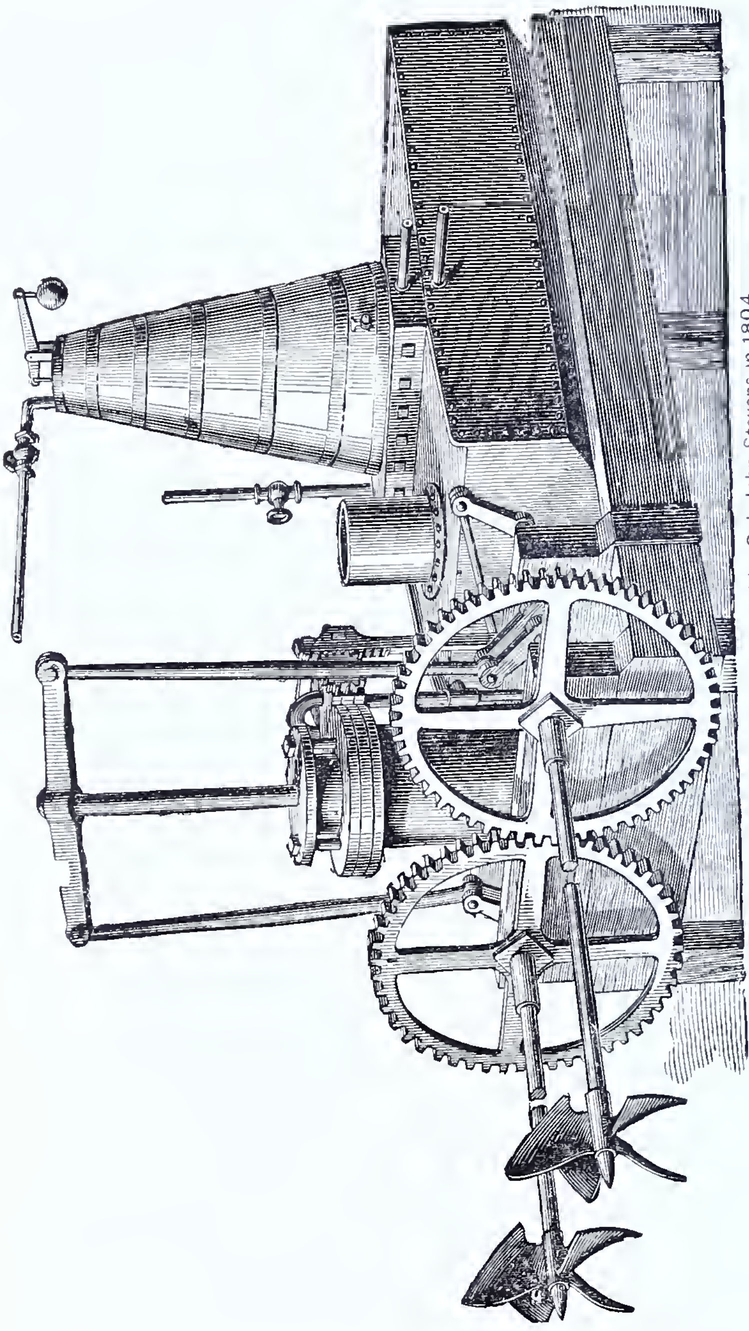
The Machine Shop contains one of Sellers' planers, Star Tool Co. and Baldwin lathes, a Browne & Sharpe universal milling machine, an upright drill, emery grinder, and other machine tools; sets of hand tools, including Whitworth's standard gauges, and also wood working tools.

The shafting is from Sellers & Co.

The driving engine is supplied by the New York Safety Power Co., and the larger double engine of twenty horse power, intended for use as a working model, is a gift from the trustees of the Stevens Estate.



Ribbon Brake. By J. Salleron.



Engine, Boiler and Screw Propellers used by Col. John Stevens in 1804.

The collection of engineering relics is becoming very interesting, and includes the high pressure condensing engine, and water tubular boiler, and screw which, in 1804, drove John Stevens' first steamboat eight miles an hour on the Hudson, and also the twin screws used in 1805 by that engineer with the same engine. The patent certificate issued from the English Patent Office in 1805 on this boiler, and models are preserved here. Autograph letters of Robert Fulton, of Robert Stevenson and of Commodore Decatur, and autograph drawings by Robert Fulton of the engine of his first successful steamboat, the Clermont, and of the Chancellor Livingston, are to be seen in the lecture room. Models of the earliest of iron-clads, the Stevens battery, are here also.

The Professor of Engineering reports the following contributions to date:

FROM TRUSTEES OF THE STEVENS ESTATE.—Double Steam Engine; Engine, Boiler and Screws used by Col. John Stevens, 1804–5; Root Steam Engine; Blacksmith's Forge and Tools; large Collections of Drawings of Machinery; Collections of Models of Vessels and Machinery; Valuable Autograph Letters.

JOHN P. TAYLOR.—Model and Engravings, Torpedo Boat of 1845.

MRS. E. A. STEVENS.—Bust of Col. John Stevens.

WM. H. SHOCK, U. S. N.—Valuable Drawings and Relic of Fulton.

GEORGE B. WHITING, Washington.—Large number of Drawings,

LIGHTHOUSE BOARD, Treasury Department.—Set of Drawings, Lithographs and Publications of the Board.

JOHN F. WARD, New York.—Model of Spherical Jointed Pipe.

BABCOCK & WILCOX, New York.—Drawings of Engines and Boilers; Driving Engine in Machine Shop.

SELLERS & CO., Philadelphia.—Giffard Steam Boiler Injector, and samples of Hangers and Couplings for Shafting.

BLAKE BROS., New Haven.—Model Stone Breaker.

E. K. Rider, New York.—Model Steam Engine.
G. H. Clemens, " Model Gear Cutting Engine.
D. P. Davis, " Recording Steam Gauge.
Manhattan Oil Co., New York.—Samples Animal and Vegetable Oils.
Downer Kerosene Co., Boston.—Samples Mineral Oils.
Joseph S. Fay, Boston.—Specimens Lake Superior Ores.
Cooper, Hewitt & Co., Trenton, N. J.—Set Beam Sections.
Baird & Co., Philadelphia.—Collection Photographs.
Richards, London & Kelly, Phila.—Collection Photographs.
J. C. Day, Hackettstown, N. J.—Samples New Jersey Ores.
Penna. Steel Works, Baldwin Station, Pa. R. R.—Samples Steel and Ores.
T. G. Smith, New York.—Samples Ores and Minerals.
T. H. Niven, Hoboken.—Samples of Metals. Woods, etc., etc.
C. E. Emery, New York.—Specifications of Steam Vessels.
R. H. Buel, New York.—Model Marine Screw Engine.
Commiss. of Patents, Washington.—Large Collection Models.
Wm. D. Andrews & Co.—Centrifugal Pump.
Short Manufacturing Co.—Coupling for Shafting.
S. T. Thurber, Rhode Island.—Iron Ores.
Lyon, Short & Co., Pittsburg, Pa.—Iron Ores.
E. B. Martin, Stourbridge, Eng.—Elastic Steam Boiler Models.
J. Wood & Co., New York.—Lubricator.
Providence Steam Engine Co.—Hopkinson Steam Engine Indicator.
Wm. Hewitt, Trenton, N. J.—Broken Crank Pin—unique.
Robert Weir, New York.—Model Dick Press.
Alberto Malo, Guanojuato, Mexico.—Mining Tools and Ores.
Chas. H. Haswell, New York.—Fulton Autograph Drawings and Specimens of Minerals.
Root Steam Engine Co.—Model Root's "Sectional" Steam Boiler.
Mrs. C. T. Perry.—Model of U. S. Sloop of War "Hornet."

In addition to the above, a large number of drawings and photographs of bridges, locomotives and other constructions have been received from many friends of the Institute.

COLLECTIONS IN THE DEPARTMENT OF DRAWING.

A set of Models of Problems in Descriptive Geometry, of Wood and Metal, from Schröder, of Darmstadt. A set of Olivier's Models, with brass frames and silk cords, and a large collection of Model Drawings of subjects in Mechanical Engineering and Architecture ; as, also, a large collection of all such Drawing instruments as are desirable, and not included in the simple sets required by each student.

COLLECTIONS IN THE DEPARTMENT OF CHEMISTRY.

The collections of the Chemical Department may conveniently be classified under four heads :

I.—Cabinet of Minerals, Rocks, Fossils, Economic Minerals and Models of Crystals.

II.—Cabinet of Ores, Metallurgical Products and Models of Furnaces.

III.—Cabinet of Chemical Substances, arranged according to their chemical relationships, and Cabinets of Applied and Industrial Chemistry.

IV.—Museum of Apparatus pertaining to Chemical Physics and to Theoretical and Applied Chemistry.

I.

The Cabinet of Minerals comprises 5,500 specimens. They are divided into six collections:

1. Systematically classified, according to the chemical and crystallographic nature of the substances.
2. Large specimens, showing the including rocks and the association of minerals.
3. Unclassified and unlabelled substances, for use by students in the determination of minerals.

4. Lithological ; 100 specimens, systematically arranged, of the rocks of Europe.

5. Geological ; 500 specimens, systematically arranged, of the characteristic fossils of the geological formations.

6. Building stones employed in the United States.

A sufficient number of models of crystals has been obtained to illustrate the crystalline form of the most important mineral species, and to elucidate the science of crystallography.

The thanks of the Professor of Chemistry are due to the following gentlemen for their donations: John C. Trautwine, Rev. E. R. Beadle, Theodore D. Rand, Clarence S. Bement, Dr. Isaac Lea, Moses Williams, Westchester, Pa.; W. W. Evans, J. C. Day, Hackettstown, N. J.; William Arthur, Brooklyn; Professor E. T. Cox, State Geologist of Indiana; J. Morton Poole, Wilmington, Del.; Judge Hand, Elizabethtown, N. Y.; Rev. S. B. Dod, James A. Donaldson, and T. Niven, Hoboken.

II.

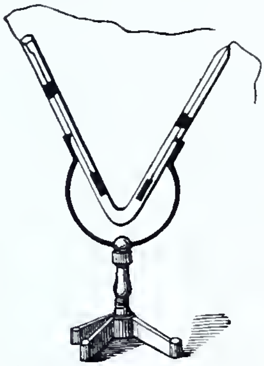
In process of formation.

III.

The Cabinet of Chemical Substances comprises specimens of Barium, Strontium, Palladium, Selenium, Titanium, and the rarer metals generally in the elementary condition; also, all the common and many of the rare metallic salts. A sufficient number of specimens, illustrating the application of Chemistry to the arts, has been procured to lay the foundation of a Cabinet of Technical Chemistry, and the attention of manufacturers who may desire to deposit, in a public place devoted to Technical Sciences, specimens of their products is particularly called to this important collection.

IV.

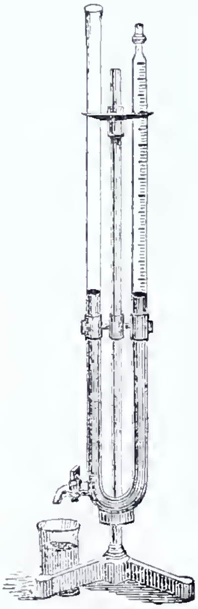
Apparatus for burning phosphorus in oxygen ; acid and cobalt bottles for testing ; liquified carbonic acid in strong glass tube; Scheibler's apparatus for determining the quantity of carbonic acid in bone ash; carbonic acid generators; sulphuric acid dessicating pans; Hofmann's hydrochloric acid apparatus; acidimetry jars, graduated from 100 to 1000 c. c.; sulphuric acid generators; phosphoric acid generator; phosphorous acid generator; pipettes and syphons of various sizes, for acids and alkaline liquids; adapters, straight and curved; alcoholometers of various standards, with jars and cases; alembics; carbonic acid apparatuses of Wetherell, Fresenius Wills, Berzelius, Rose, Mohr, Geissler and Kipp; alkalimeters of Mohr, Leslie, Descroizillé and Gay Lussac.



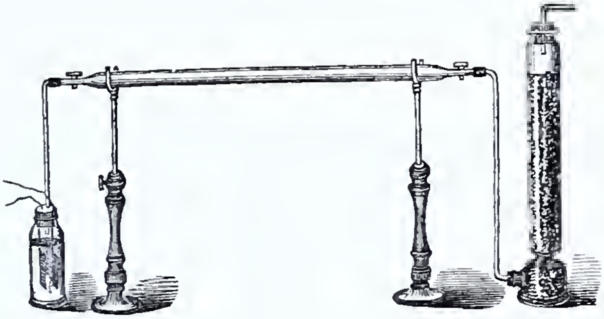
Hofmann's Apparatus for Decomposing Ammonia.

Hofmann's apparatus for decomposing ammonia; ammonic chloride apparatus; blowpipe anvils; arsenic apparatuses of Marsh, Fresenius and Mitscherlich; arsenic tubes; Becker's balances; scales of various sizes; collodion balloons; barometer tubes; beakers of Griffin's and of German form; bell jars; hand and foot bellows; blast lamps; blowpipes; oxyhydrogen blowpipes; hydrogen blowpipes; boltheads; burettes of Gay Lussac, Geissler and Mohr; Erdmann's floats; burette holders and clamps; Warmbrunn and Quilitz's Bunsen burners; De Saga's Bunsen burner for spectroscopic work; Leppin and Mäsche's self regulating burner; compound and rose burners; Professor J. Laurence Smith's burners; colorimeter; capsules of Berlin and Meissen porcelain; casseroles; Plattner's borers, various patterns; calcic chloride jars and tubes; chlorine generators; platinum and porcelain boats for ignitions and combustions; furnaces for organic combustion; combustion tubes; magnetized bars and compass for determination of minerals; Liebig's condensers of glass, tin and brass; sulphurous acid condensers, straight and U shaped, with stopcocks; generators of small quantities of gases; platinum cones for Bunsen's pump; connecting tubes—straight, curved, plain, bulbed—with safety tubes and T joints; cork borers, knives and presses; crucibles, Hessian, iron, plumbago, royal Berlin, Meissen and platinum;

crucible moulds and supports; crucible tongs; cryophori; crystal drainers; crystallizing dishes of porcelain and glass; cupels; cupel moulds; cylinders, graduated and stoppered; collodion flasks; deflagrating covers, globes, jars, stands and holders; dessicators, of bell jar pattern, Schrotter's pattern, and with ground glass caps; dyalyser; cutting diamonds; diamond mortars for crushing minerals; digestors, royal Berlin and Meissen; iron dippers and ladles; displacement apparatus of various patterns; Döbereiner's lamp, dropping pipettes, drying baths and oven; elutriators; diffusion apparatus; ether still; eudiometers.


Hofmann's Lecture Eudiometers.

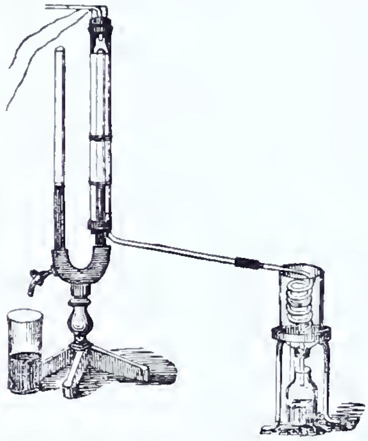
Hofmann's lecture eudiometers; assay flasks; round and flat bottomed glass, copper and iron flasks; forceps, funnels, cupel furnaces, galvanic batteries, gas bags, pressure boards, gas bottles; Kipp's gas generators; Bunsen's mercurial gasometer; gas pistols, gas tubes, Geissler tubes; glass blowers' tables; glass plates for analysis of colored flames; goniometers of Hauy, Wollaston and of Mitscherlich, improved by Groth; blowpipe hammers; Von Kobell's scales of fusibility; Mohr's scales of hardness; hydrometers for acids and alkalies, beer, wine, milk, ethers, alcohols, oils and saline solutions; of Beaumé's and Twaddle's scales; universal for specific gravity of liquids lighter and heavier than water; ignition tubes; Hofmann's improved lecture apparatus for electrolysis of water, hydrochloric acid, etc.; jets of glass and brass, various patterns; platinum retort, with platinum funnel, condensing tube and receiver; graduated flasks; mercury troughs; mixing capsules; agate, glass and iron mortars and pestles; wedgewood mortars; muffles; Will's nitrogen bulbs; nitrous oxide generators; photographic dishes and baths of glass, porcelain and India rubber; nipper taps; pipettes, straight, bulbed, cylindrical, plain, graduated and of constant volume.



Hofmann's Apparatus for Analysis of Hydrochloric Acid.

Hofmann's apparatus for analysis of hydrochloric acid; platinum dishes; Sprengel's mercurial pump; pneumatic troughs, tin and glass; single barreled air pump, for use in organic analysis; potash bulbs of Geissler, Liebig, Mitscherlich and Mohr; precipitating glasses; bisulphide of carbon prisms; retorts, plain and tubulated; rings—straw, brass, iron and glass of various sizes; rubber tubes, corks, sheets, cylinder and cones of various description; sieves of hair, brass, bolting cloth, etc.; spatulas of glass, horn, porcelain and platinum of various sizes and patterns; Hofmann's lecture apparatus for demonstrating the composition of hydrochloric acid; specific gravity bottles; spectroscopes (Hawkins & Wale) for direct vision, and De Saga's spectroscope, charts and stands; stills (large) for the manufacture of distilled water—small, for special purposes; stop cocks, glass and brass, of various sizes and patterns; Hofmann's lecture apparatus for synthesis of carbonic and sulphurous acids; burette and pipette stands, of various patterns; retort and apparatus stands, various patterns; tanks for absorbing media and lantern; cathetometer; test tubes, various sizes; test tube racks and holders, various patterns; thermometers, Fahrenheit and centigrade; tongs—cupel, crucible, iron, German silver and platinum; triangles—glass, iron, porcelain, fire-clay, platinum; tripods—iron and brass; tourmaline pincers; various water baths; washing bottles, various patterns; water bath at constant level; Jolly's spring balance; Hofmann's apparatus for eudiometric analysis of water, marsh gas and olefiant gas; Hofmann's apparatus for volumetric analysis of hydrochloric acid, water and ammonia; Hofmann's apparatus to demon.

strate the constancy of proportion between the elements of water.



Hofmann's Apparatus for Volumetric Composition of Water.

Hofmann's apparatus to demonstrate the proportion between the volumes of hydrogen and oxygen in water; Hofmann's apparatus for demonstrating the equality of volume of simple and compound gases under equal variations of temperature and pressure.

LIBRARY.

The Library is constantly receiving accessions, as full sets of the various scientific journals and proceedings of societies can be obtained. It already contains, in addition to the various standard works on science and engineering in English, French and German, full sets of The Philosophical Transactions of the Royal Society, The Proceedings of the Royal Institution, The Comptes Rendus of the French Academy, and transactions of various other societies. Also, the Philosophical Magazine, Taylor's Scientific Memoirs, Engineering, The Engineer, The Mechanics' Magazine, Cosmos, Les Mondes, Annales de Chimie et de Physique, Chemical News, Silliman's Journal, The Journal of the Franklin Institute, Nature, Poggendorff's Annalen and Carl's Repertorium. These are all in full sets to date, and new issues are regularly received, as also is the case with all the American publications bearing upon general science or the special subjects of Mechanical Engineering, including the full series of specifications published by the Patent Office.

THE COURSE OF INSTRUCTION.

The full Course in the Stevens Institute of Technology will occupy the period of four years, each year being divided into three terms, as follows:

First Term.—From the third Wednesday in September to the Saturday before Christmas.

Second Term.—From the second day of January (or, in case this falls on a Sunday, the third day) to April 2d.

Third Term.—From April 13th to the end of the second week in June.

The Institute will open in the present year on Wednesday, September the seventeenth.

Detailed accounts of the Course of Study in each department will be found on the following pages.

DEPARTMENT OF MATHEMATICS AND MECHANICS.

It is intended in this course to give the student such a thorough knowledge of the several branches of Mathematics as will enable him to use them advantageously in the investigation of Practical Problems.

The Course is arranged as follows :

FIRST YEAR.

Review and conclusion of Algebra, and review and conclusion of Geometry and Trigonometry, and Analytical Geometry begun.

Text-books.—Ray's Algebra, Part II; Olney's Geometry and Trigonometry, and Olney's General Geometry.

SECOND YEAR.

Analytical Geometry concluded and Differential and Integral Calculus.

Text-books.—Olney's General Geometry and Courtenay's Calculus.

THIRD YEAR.

Analytical Mechanics and Resistance of Materials, and Theory of Bridge Building.

Text-books.—Smith's Analytical Mechanics, and Wood's Resistance of Materials and Theory of Bridges and Roofs, and Lectures.

DEPARTMENT OF BELLES-LETTRES.

The subjects included in this department will be presented under the general heads of Rhetoric, the English Language, English Literature and History.

The time appropriated to these studies will be occupied, during the first year, with Rhetoric.

Text-book.—Hart's Manual of Composition and Rhetoric.

The English Language will form the subject of the second year. It will be studied under the following heads: Its sources, its history, its vocabulary, and its synonyms.

Text-book.—Fowler's English Language.

The third year will be occupied with English Literature.

Text-book.—Shaw's Manual.

During the fourth year history will be studied.

Text-book.—Weber's Outlines.

These subjects will be taught by text-books and lectures. Throughout the whole course original essays will also be required, embodying and illustrating the several subjects presented. Declamations, also, both original and selected, will be prepared, to afford opportunities for practical lessons in elocution and oratory.

DEPARTMENT OF LANGUAGES.

"If we study living languages," says Max Müller, "it is not for their own sake that we acquire grammars and vocabularies —it is for their practical usefulness. We use them as letters of intruduction to the best society and the best literature of the leading nations of Europe." Of this literature the scientific part is of immediate practical value, while the rest forms an indispensable means of conveying that general culture without which no engineer of the present day may hope to obtain eminent or lucrative positions. The student, at the very outset of his practical work, which begins with the third year in this Institution, absolutely needs a knowledge of French and German to be able to avail himself of the latest discoveries and discussions constantly published in foreign scientific periodicals. If his vocation should call him to the promising countries of South America, where the lack of practical science is just beginning to be felt, or to Europe, or among our own foreign population, a *speaking* knowledge of foreign tongues will be of infinite advantage to him.

It is with a view to these considerations that a thorough regular Course of French and German has been arranged—in addition to which the student may acquire Italian, Spanish, or Portuguese, if he desires.

FIRST YEAR.

Lectures on Study of Languages. Otto's French Grammar. Peissner's German Grammar.

In the last term, reading from Chapsal's Littérature Française and Adler's German Reader.

SECOND YEAR.

Scientific reading in French and German. The grammar continued.

THIRD YEAR.

Recitations on Scientific subjects in French and German. Compositions. Reading continued.

FOURTH YEAR.

Students write descriptions of their work in the laboratories in French and German. Writing of commercial letters. Business forms. Lectures on Foreign Literature.

DEPARTMENT OF CHEMISTRY.

FIRST YEAR.

First Term.

Lectures on Chemical Physics and the Chemistry of Non-Metallic Elements. Recitations upon written Notes of Lectures and upon Williamson's Chemistry (new edition), from § 1 to § 84.

Second Term.

Chemistry of the Non-Metallic Elements finished. Stoichiometry, with blackboard exercises. Recitations upon Lecture Notes and upon Williamson's Chemistry, from § 84 to § 157.

Third Term.

Chemistry of the Metals. Recitations upon Lecture Notes and upon Williamson's Chemistry, from § 157 to § 223.

Books of Reference—Naquet's Principes de Chimie. Watts' Dictionary of Chemistry. Wurtz's Histoire des Doctrines Chimiques. Hofmann's Einleitung in die Moderne Chemie. Elliot and Storer's Manual.

SECOND YEAR.

First Term.

Laboratory Exercises and Recitations upon Fresenius' Qualitative Analysis.

Second Term.

Lectures upon Organic Chemistry. Recitations upon Lecture Notes and upon Williamson's Chemistry, from § 223 to § 349. Laboratory Exercises in Qualitative Analysis. Bunsen's Flame Reactions.

Third Term.

Laboratory Exercises and Recitations upon Fresenius' Qualitative Analysis.

Books of Reference.—Kekulé's Organische Chemie. Wills' Tables for Qualitative Chemical Analysis. Storer's Dictionary of Solubilities.

THIRD YEAR.

First Term.

Laboratory Exercises in determining Minerals, assisted by Egleston's Tables and Plattner's Blowpipe Analysis. Exercises in Crystallography and the Drawing of Crystals.

Second Term.

Metallurgy. Metals by Bloxam, ¶ 1 to ¶ 152. Mitchell's Manual of Practical Assaying.

Third Term.

Metallurgy. Metals by Bloxam, ¶ 153 to ¶ 295.

FOR STUDENTS ELECTING CHEMISTRY.

In addition to the above, Laboratory Exercises and Recitations upon Fresenius' Quantitative Analysis during the entire year.

Books of Reference.—Dana's Manual of Geology. Cotta's Lithology. Cotta's Treatise on Ore Deposits, edited by Prime. Metallurgy, edited by Crookes and Röhrig. Knapp's Chemical Technology, edited by Ronalds, Richardson and Watts. Dana's Mineralogy.

FOURTH YEAR.

FOR STUDENTS ELECTING CHEMISTRY.

First and Second Terms.

Laboratory exercises and lectures upon Analysis. Chemistry of the rare elements.

Third Term.

Chemical theses. Photography to special students.

Books of Reference.—Wöhler's Mineral Analyses. Crookes' Select Problems. Finkener's Rose's Chemical Analysis. Annales de Chimic. Annalen der Chemie. Chemical News. Full sets of these and all other important journals are provided for consultation in the Institute Library.

ADVANCED STUDENTS.

Courses of study determined by special arrangement.

The students who propose to obtain the degree of Doctor of

Philosophy, will devote as much of the time allotted to this department in the fourth year as may be deemed essential to the preparation of a thesis embodying the results of an original research.

THE DEPARTMENT OF PHYSICS.

This department offers the student every facility for the acquisition of a thorough knowledge of physics.

During *the first year* the first term is given to the study of the inductive method of research, to the general properties of matter, and to inductive mechanics ; the second term, to pneumatics and to the laws of vibratory motions and acoustics ; the third term to heat.

In *the second year* the first term is occupied in the study of the applications of the laws of heat to the action of heat engines and to meteorology ; the second term is spent in the study of light, and the third is devoted to magnetism and electricity.

During the third and fourth years the student works in the physical laboratories, pursuing experimental investigations, schedules of which are prepared for him by the professor of physics, who, during the progress of this work, will deliver special lectures on the investigations embraced in the Laboratory Course.

The extensive cabinet of instruments which the Institute possesses, and which is constantly increasing, affords the student advantages which are nowhere equalled.

To facilitate the work of the laboratory, the construction, uses and adjustments of the instruments are concisely described by references to letters or numbers, engraved or pasted on the actual instruments of the laboratory. The methods of evolving from the experimental determinations their most accurate numerical values and their probable errors will be carefully discussed, as well as the proper methods to be employed in expressing them graphically.

The students who are studying for the degree of Doctor of

Philosophy will obtain this honor only after their laboratory work has been approved of by the Professor of Physics, and a thesis, embracing an original investigation, has been laid before the Faculty.

This work in the physical laboratory is one of the most important elements of the General Course: First, by reason of the precise and ineffaceable knowledge so attained of the facts and laws actually studied; secondly, on account of the advantage which it confers in educating the hands as well as the mind; and, thirdly, by training the student in methods by which new facts and laws may be discovered, and the new problems of actual experience successfully attacked.

The advantages which will ensue from such a course of instruction have long been appreciated by the most eminent original investigators, and we will here add, in that clear and trenchant style which is a characteristic of his mind, the views on this subject entertained by Professor Tyndall, in his "Fragments of Science" (London, 1871): "Accepting in many respects his culture from his fellow men, taking it from spoken words and from written books, in some one direction, the student of nature must actually touch his work. He may otherwise be a distributor of knowledge but not a creator, and fails to attain that vitality of thought and correctness of judgment which direct and habitual contact with natural truth can alone impart.

* * * * * *

"Half of our book writers describe experiments which they never made, and their descriptions often lack both force and truth; no matter how clever or conscientious they may be, their written words cannot supply the place of actual observation."

It would be proper to state, in this connection, that the facilities of the laboratories and cabinets of the Institute will be extended to advanced students who may wish to avail themselves of such means in carrying out their investigations, on such conditions as may be determined by arrangement in each special case.

DEPARTMENT OF MECHANICAL DRAWING.

The aim of this department will be to give the student a thorough knowledge of the various methods employed in the graphical expression of all the facts and ideas related to the science of Mechanical Engineering ; with this will be combined such an amount of *actual work*, in practice in the formation of plans as well as in the execution of working drawings in general and in detail, as will, it is hoped, render him in all respects an accurate, reliable and efficient practical draughtsman.

The general division of the Course will be as follows :

FIRST YEAR.

First Term.

Elementary Geometrical Problems relating to Points, Lines, Circles and Polygons.......... ....TAUGHT BY LECTURE.

Second Term.

Problems on Plain Figures continued, with Elementary Lessons in Projection..................... ....TAUGHT BY LECTURE.

Third Term.

Elementary Projections continued, with Instruction in Shading and Tinting...TAUGHT BY LECTURE.

SECOND YEAR.

First Term.

Descriptive Geometry, commenced..................TEXT-BOOK, CHURCH.

Second Term.

Descriptive Geometry, concluded... ....TEXT-BOOK, CHURCH.

Third Term.

Shades, Shadows and Perspective, commenced........TEXT-BOOK, CHURCH.

THIRD YEAR.

First Term.

Shades, Shadows and Perspective, concluded.........TEXT-BOOK, CHURCH.

Second Term.

Elements of Mechanism..........................TEXT-BOOK, WILLIS.

Third Term.

Elements of Mechanism............................TEXT-BOOK, WILLIS.

FOURTH YEAR.

During this year the whole of the time devoted to this department will be employed in the practical application of the preceding studies—to problems such as would present themselves to a Mechanical Engineer in the active exercise of his profession—including the analysis and planning in detail of engines and machinery, as well as the drawing of such details, and general plans of complete machines and structures.

It is to be understood that, from the beginning of the second year, and, when warrantable, from an earlier period to the end of the Course, a portion of the time is to be devoted to the application of previously acquired knowledge in constructing working drawings from and for existing or projected structures; it being intended so to combine the Course in this department with that in Mechanical Engineering, that the student shall be able, finally, not only to copy what others have done but to arrange and execute for himself, intelligibly, accurately and neatly, complete plans of any combination which he may be called on to design.

DEPARTMENT OF MECHANICAL ENGINEERING.

At the close of the second year the student will be prepared to enter upon the studies of the Department of Mechanical Engineering, which will occupy the principal portion of his time during the remainder of his course.

The Course of Instruction in Mechanical Engineering will commence with lectures upon the nature of materials used in constructing, locating and operating machinery, and the methods of obtaining them and preparing them for use, so far as such instruction is not included in the Course in Technical Chemistry. The uses to which each material is specially adapted are stated, the methods of testing their quality and of preserving them from decay are described, while the principles and practical considerations involved in the application of tools to the working of each are exhibited in the workrooms of the Institute.

A Course of Instruction in the Strength of Materials follows, in which the laws determining the forms of greatest strength are deduced from experiment, and applied in the solution of such problems as arise daily in engineering practice.

Thus the student will be made to develop for himself the laws of flexure of beams, variously supported, of torsional, compressive or tensile strain, and the relations of strength to form and nature of material by means of apparatus which will be put into his hands, and which he will be taught to use.

Special attention is given to the examination of the results of experiments made for the United States Government upon American iron and steel.

In the illustration of this portion of the Course samples exhibiting the various qualities of each material are placed before the student for his inspection; models and drawings illustrate the methods of their preparation, and specimens of materials, wrought into their strongest forms, impress upon him the principles already learned of the strength of materials, and their application in design.

The mathematical principles and the theory of the strength of materials are taught in the Department of Mathematics.

The course is continued by the study, from the text-book and lecture, of the Theory of Machinery, with detailed instructions in the use of tools and in designing machinery and mill work, care being taken to call the attention of the student to such modifications in design as are dictated by difficulties in forging, pattern making, moulding, finishing and "fitting up."

Finally, the course is completed by a series of lectures and lessons from text books treating of the prime movers, accompanied by exercises in planning and estimating the cost of machinery, mills and manufactories. While studying heat engines the steam engine is made a subject of special and extended investigation in its principles, and in the details of design, construction and management, according to the best and most recent practice.

Problems in design will be presented to the student at intervals during the Course, which will be made, as far as possible, similar in character to those which meet the Mechanical Engineer most frequently in the practice of his profession.

The student will be informed of the exact result to be attained, and of the conditions necessary and means available for reaching it. He will then be expected to prepare his plans and to submit them to the Head of the Department, together with a report, oral or written, for criticism.

A "graduating thesis" will be demanded of the student at the close of his studies, in which he will be expected to exhibit his proficiency by designing and describing the construction and management of some machine, or in planning a manufacturing establishment—giving estimates of cost.

The originals of these theses will be retained at the Institute, and deposited among the manuscripts of its library.

The workshop, fitted up with hand and machine tools, enables the student to become practically acquainted with working machinery, and will be made useful to the Institute by adding new models to its collection.

WORK IN DESIGNING MACHINERY.

During the year just closed the students of the Stevens Institute of Technology have done a considerable amount of work, under the direction of the Professor of Engineering, and under the immediate supervision of the Professor of Drawing, in designing apparatus and machinery, and in making general plans and detail drawings of bridge work, &c., &c.

The design of a steam anchor hoisting apparatus for the Stevens Battery has been entrusted to one student, who has produced a most satisfactory plan and working drawings, laying out the work, and calculating sizes of all its parts.

Work has been commenced upon the plans of a powerful machine for testing the tensile strength of materials. The plans of a machine for determining the value of various lubricants by the use, simultaneously, of thermometrical and dynamometrical measurements of friction, and the measurement, at the same time, of the pressure upon the bearing, have been completed by advanced students.

It is proposed, during the ensuing year, to make the necessary drawings of alterations proposed, by which to "compound" the engines of a large steamship, and to complete designs of a number of less important pieces of work.

PROFESSIONAL WORK AND VISITS OF INSPECTION.

The students receiving instruction in Engineering have, during the past year, received a considerable amount of instruction outside the class rooms.

During the important trial of competing steam boilers, at the Annual Exhibition of the American Institute of the State of New York, 1872, the log was kept by selected students, under the supervision of the Professor of Mechanical Engineering, who was Chairman of the Committee under whose charge was placed the management of the Machinery Department of the Exhibition.

The students pursuing the Course in Engineering were present at the trials of Road Locomotives and Steam Road Rollers, at South Orange, N. J., October, 1872,* keeping the log and assisting in the conduct of the trials.

The log of the trial of a new form of steam engine was also kept by students of the Stevens Institute of Technology, indicator cards being taken and all data entered on the log each half hour.

They also attended the competitive trials of several forms of Centrifugal Pumps, keeping the log, under the direction of Professor De Volson Wood, Chairman of the Committee of Judges.

Visits of inspection have been made by the students to the works of the Providence Steam Engine Co., the Corliss Steam Engine Co., the Root Steam Engine Co., the Morgan Iron Works, the Brown & Sharpe Manufacturing Co., the American Screw Co., and to various flouring mills and manufactories in New York and other cities.

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* *Journal Franklin Institute*, January, 1873.

Visits have also been made to the steamships building in New York for the Pacific Mail Co. and for the U. S. Navy, to inspect their compound engines and other machinery, and to the Stevens Battery, to examine into the construction of the iron hull and the machinery of that powerful vessel.

Such use of time is considered to be as profitable as it is pleasant to both students and instructors.

TEXT-BOOKS AND BOOKS OF REFERENCE.

Mahan	*Civil Engineering.*
Mosely	*Mechanics of Engineering.*
Weisbach	" " "
Van Buren	*Strength of Iron parts of Machinery.*
Pole	*Iron as a Material of Construction.*
Rankine	*Mill Work and Machinery.*
"	*Steam Engine and other Prime Movers.*
Fairbairn	*Mills and Mill Work.*
Knight	*Mechanician and Constructor.*
Tredgold	*Carpentry.*
Bourne	*Treatise on the Steam Engine*

REQUIREMENTS FOR ADMISSION.

Candidates for admission to the first year of the Course should not be less than sixteen years of age, and must be prepared to pass a satisfactory examination in English Grammar, Geography, Arithmetic, Algebra—including quadratic equations—Plane Geometry, as given in Davies' Legendre—Plane Trigonometry—solution of Plane Triangles.

Candidates for admission to the higher classes must be prepared to pass a satisfactory examination in the studies previously pursued by the classes which they propose to enter.

Advanced students and men of science desiring to avail themselves of the appliances of the laboratories of the Stevens Institute, to carry on special investigations, may make arrangements to that end with the President.

EXAMINATIONS.

Examinations in each department will be held in public at the end of each term; and, previous to graduation, a special examination, also in public, will be had of the graduating class; and, from the combined results of all these examinations, the questions of proficiency and qualifications for degrees will be determined.

The transfer of a student from a lower to a higher class will depend in each case upon the result of the examinations of the year preceding the time of transfer, so that no student can pass from a lower to a higher class until he has given satisfactory evidence of his proficiency in the studies of the former.

Examinations for admission will be held during the second week in September of each year.

DEGREES.

The Stevens Institute of Technology, as will be seen from its secondary title, and from the account of its general scope and plan of studies already given, is essentially a School of Mechanical Engineering, and will, therefore, confer upon its regular graduates the degree of Mechanical Engineer when due evidence of proficiency has been afforded in the final examinations, and upon the presentation of these .as described already.

It will be seen, however, from the detailed description of work in the various departments, that a very thorough training in the general principles of Physical and Chemical Science is involved in the Course laid out for the Mechanical Engineer, and it has, therefore, been thought advisable to give opportunity to those students who may find their inclination and capacity leading them in the direction of these sciences to pursue a Course of Physics and Chemistry as an alternative to that of Mechanical Engineering.

During the first two years the Course of Studies embraces those general principles which are essential in any scientific pursuit, but in the third and fourth years the student may substitute work in the Physical and Chemical Laboratories for the time otherwise devoted to Engineering, and may then graduate with the degree of Doctor of Philosophy, after passing the requisite examinations and presenting theses on subjects in Chemistry and Physics.

EXPENSES.

The fees for each year of the entire Course, for instruction and use of instruments, are seventy-five dollars for residents of the State of New Jersey, according to the express provision in the will of Mr. Stevens, but for those not residing in this State at the time of their attendance upon the school, the yearly fees will be one hundred and fifty dollars.

In the Chemical Laboratory each student will be supplied with a set of reagent bottles; and an adequate quantity of chemicals and platinum vessels, agate and steel mortars, etc., will be loaned to him from time to time, as his work may make their use necessary. With reference to other apparatus, he is at liberty to furnish himself from any dealer or to borrow from the supplies of the school. In the latter case he must make a deposit of twenty dollars. At the end of each session he will be credited with those articles returned in good order, while the cost value of those destroyed will be deducted from his deposit. A charge of $5 per term will also be made to each student working in the laboratory, to cover consumption of apparatus and material, which cannot be charged in detail.

In the Drawing Department each student will be expected to furnish his own instruments and materials—the former of which may be had, of good quality, for fifteen dollars.

The student is advised not to make his purchases before coming to the Institute, as arrangements have been made with dealers in New York by which the best articles can be had on advantageous terms.

The fees are payable in advance, at the beginning of each term.

Lodging and commons will not be supplied in connection with the Institution; but board, on reasonable terms, may be readily secured in private families in the city at a cost of $8 a week.

List of Students.

STUDENTS OF FIRST CLASS.

Class of 1876.

Beckmeyer, Henry A.,	New Jersey.
Brewer, Samuel B.,	New Jersey.
Buerk, John O.,	Indiana.
Buttolph, Frank D.,	New Jersey.
Chandler, Charles B.,	Florida.
Clay, A. Morgan,	New Jersey.
Damasceno, Juan Das,	Brazil.
Dennis, Warren E.,	New Jersey.
Duane, Howard,	New York.
Diehl, William,	Pennsylvania.
Gandarillas, Juan D',	Peru.
Grove, William E.,	Chili.
Hilgard, F. E.,	Washington.
Jewett, George G.,	New Jersey.
Kimber, M. C.,	Pennsylvania.
Kingsland, Joseph,	New Jersey.
Raqué, Philip E.,	New Jersey.
Riesenberger, Adam,	New Jersey.
Soné, N.,	Japan.
Stahl, Albert W.,	New York.
Trautwein, Alfred P.,	New Jersey.
Vail, Eugene L.,	New Jersey.
Wall, Edward,	New Jersey.
Wallis, J. M.,	Louisiana.
Wiles, Edwin L.,	New York.
Wolff, R. Alfred,	New Jersey.
Zimmermann, William F.,	New Jersey.

SECOND CLASS.

Class of 1875.

Bachmann, Valentine,	Kentucky.
Cremer, James M.	Pennsylvania.
Denton, James E.,	New Jersey.
Dickinson, Gordon K.,	New Jersey.
Graydon, Samuel D.,	New Jersey.
Fezandié, Hector,	New York.
Idel, Frank E.,	New Jersey.
Knapp, I. N.,	Connecticut.
Koezly, Theo. F.,	New York.
Leavitt, Frank McD.,	New Jersey.
Poole, J. M.,	Delaware.
Rumpf, Wm. H. A.,	New Jersey.
Sorge, Adolph G. F.,	New Jersey.
Wall, George Barry,	New Jersey.
Yamada, Y.,	Japan.

THIRD CLASS.

Class of 1874.

Poinier, P. P.,	New Jersey.
Post, Henry W.,	New Jersey.
Thayer, Floyd S.,	Illinois.

FOURTH CLASS.

Special Students—1873.

Henderson, J. A.,	New York.
Garretson, F. M. D.,	New Jersey.
Schoeder, Paul S. B.	New Jersey.
Hance, Theo. F.	New Jersey.

ROSTER FOR 1873-4.

	MONDAY.					TUESDAY.					WEDNESDAY.					THURSDAY.					FRIDAY.					SAT.
Professors.	9	10	11	12	P.M. 2-5	9	10	11	12	P.M. 2-5	9	10	11	12	P.M. 2-5	9	10	11	12	P.M. 2-5	9	10	11	12	P.M. 2-5	
MORTON...........	1															1										
MAYER............													2		4									2	3	
THURSTON.........			4	3				4	3				4	3			4	4	3		4	4				3, 4
WOOD.............						1	2				1	2	3			3	1	2				3	2	1		
MAC CORD.........	2	2			3, 4	3, 4	3, 4				3, 4	3, 4			2	2	2			3, 4	1	1			2	1
LEEDS............		3						1		4					3				2	2						
KRŒH.............		4	1	2		2	1	3			2	1										2	1	3		
WALL.............			2					2					1				3	1					4			2

In the above plan the numbers 1, 2, 3. 4 of the classes correspond to the number of years they are in the Institute, No. 1 being the entering and No. 4 the graduating class.

THE STEVENS HIGH SCHOOL,

OR

PREPARATORY DEPARTMENT

OF THE

Stevens Institute of Technology.

TRUSTEES.

MRS. E. A. STEVENS,
REV. S. B. DOD,
WM. W. SHIPPEN, ESQ.

INSTRUCTORS.

REV. EDWARD WALL, A. M., PRINCIPAL,
Latin, Greek, Rhetoric and History.

C. W. MAC CORD, A. M.,
Mechanical Drawing.

WM. EARNEST GEYER, B. A.,
Mathematics, the Physical Sciences, and German.

GEORGE N. MEAD, B. A.,
English and Latin.

DANIEL DE LAMENON,
French.

WILHELM KOEPPLINGER,
Free-Hand Drawing.

Stevens High School.

The Stevens High School is the Preparatory Department of the Stevens Institute of Technology, and its graduates are prepared for admission to the latter. Pupils are also fitted for College, and for commercial pursuits, instruction being given in all the branches taught in Classical and Commercial Academies. Its relations with the Stevens Institute give it peculiar advantages in making use of Science in the education of youth. The apparatus, and all the facilities of the Institute, are used in illustrating the elementary instruction given in Natural Philosophy and Chemistry. The students in the High School are also admitted to all the courses of popular lectures delivered in the Stevens Institute.

All the instruction in the Physical Sciences being illustrated with experiments, the information is conveyed in a form which fixes the attention, and developes the powers of observation. The facts and laws of Physical Science are embodied in the experiments, as well as narrated and interpreted by the instructor, so that the apprehension of them is more complete. So simple and easy of comprehension are many of the most important truths of Science that, even at an early age, much of the greatest value may be acquired, and, being then thoroughly assimilated, will defend from the false theories and deceptions to which all not sufficiently informed are now so frequently exposed in various business relations.

It has been also proved by experience that such instruction developes a taste for refining and beneficial home employments, which are of incalculable value in the moral training of the young.

The branches taught in the several classes, and the order in which they are studied, are exhibited in the following pages :

Course of Study.

ENGLISH DEPARTMENT.

FIRST CLASS.

Reading and Definition ; Spelling, dictation exercises ; English Grammar ; Declamation and Composition, bi-weekly exercises ; Written Arithmetic ; Mental Arithmetic ; Geography ; History of the United States ; Natural History ; Elements of Book-keeping ; Penmanship, English and German ; German Language ; French Language ; Mechanical Drawing ; Free-hand Drawing.

SECOND CLASS.

Reading and Definition ; Spelling, dictation exercises ; English Grammer ; Composition and Declamation, bi-weekly exercises ; Written Arithmetic ; Mental Arithmetic ; Commercial Arithmetic ; Book-keeping ; Geography, with Map Drawing ; History ; Algebra ; Natural Philosophy, by lectures ; Penmanship, German and English ; German Language ; French Language ; Mechanical Drawing ; Free-hand Drawing.

THIRD CLASS.

Orthography ; English Grammar ; Composition and Declamation, bi-weekly exercises ; Universal History ; Natural Philosophy and Chemistry, lectures and recitations ; Physiology and Hygiene ; Book-keeping ; Algebra ; Geometry ; Elements of Trigonometry ; Rhetoric ; French Language ; German Language ; Mechanical Drawing ; Free-hand Drawing.

CLASSICAL DEPARTMENT.

FIRST CLASS.

Orthography ; English Composition and Declamation ; Arnold's First Latin Book ; Arithmetic ; Geography ; History of the United States; Latin Grammar; Latin Reader; Smith's Smaller History of Rome; French Language; German Language; Drawing; Penmanship.

SECOND CLASS.

Cæsar's Commentaries; Harkness' Latin Prose Composition, through the course; Külner's Elementary Greek Grammar, commenced; Algebra, through the course; Virgil; Latin Prosody; Ancient Geography; Smith's Smaller History of Greece; Physiology and Hygiene; Greek Reader; Cicero's Orations; Composition and Declamation; French Language; German Language; Drawing; Penmanship.

THIRD CLASS.

Sallust; Gospels in the Greek Testament; Geometry; Ancient Geography; Smith's Smaller History of Greece; Physiology and Hygiene; Anabasis; Composition and Declamation; French Language; German Language; Drawing; Homer's Iliad, two books.

Government and Discipline.

In the government of the students reliance is placed exclusively on moral means. The punishments are *demerits, admonition by the Principal, suspension* and *dismissal.*

A copy of the Rules of Order is placed in the hands of each pupil when admitted to the school.

REPORTS.

Among the means for securing order, punctuality and diligence, great reliance is placed on a thorough and carefully administered system of grading. The attendance, the deportment, and the recitations of each student are daily recorded. These records furnish the materials for the monthly report to parents.

The Monthly Report is designed to give parents a comprehensive view of the scholarship, deportment and punctuality in attendance of their children. They are earnestly requested to make it the subject of a careful examination, and of remark in the family circle They will thus stimulate their children to greater diligence, and strengthen the moral forces by which the school is governed.

EXCUSES.

All excuses must be in writing from parents or a proper authority at home. They are in all cases submitted to the Principal, and returned with the Monthly Reports. No excuses are valid for absence from a class exercise, or a failure to recite, except sickness or absence from the city.

ACADEMIC YEAR.

The Academic Year, from the beginning of the Autumn Term of 1873, will be divided into three Terms, as follows:

Autumn Term.—From the third Wednesday in September to the Saturday before Christmas.

Winter Term.—From the second day in January (or, in case this falls on a Sunday, the third day) to the second day of April.

Summer Term.—From the thirteenth day of April to the end of the second week in June.

The next Academic Year commences Wednesday, September the seventeenth.

The advantages to pupils who enter at the beginning of the school year are obvious. They are received, however, at any time, if found qualified to join the classes in progress.

RATE OF TUITION.

The rate of Tuition will continue the same as heretofore, which is $150 per year. But with the beginning of the next School Year, in consequence of the division of the year into three terms, the charge per term will be $50.

There are no extras of any kind whatever. The charge per term covers all the expenses of all branches taught in the school.

Payments invariably in advance. Pupils entering at any time within four weeks from the beginning of a term are charged the full price. No deduction made for absence, unless on account of sickness ; and only in such instances when the absence has continued for half a term. In such cases, the loss is divided between the school and the parents of the pupil.

PHYSICAL EDUCATION.

In addition to the ample grounds furnished for exercise and games, it is the purpose of the Trustees, as soon as satisfactory arrangements can be made, to provide the students with instruction in Military Drill and the Manual of Arms.

List of Students

IN THE PREPARATORY SCHOOL.

Anderson, Edward H.	Hoboken.
Bonn, Hilli,	Weehawken.
Brachvogel, Max,	Hoboken.
Campbell, James,	Hoboken.
Campbell, Herbert P.,	Hoboken.
Chapman, Cyrus D.,	Irvington, N. J.
Day, Albert,	New Durham, N. J.
Dilworth, Walter,	Hoboken.
Dilworth, Frank,	Hoboken.
Hardenbergh, Wm. P.,	Jersey City.
Hexamer, Philip,	Union Hill.
Kimball, Charles,	Hoboken.
Kinameri, S. T.,	Japan.
Minor, Pierrepont,	New York City.
Morton, George,	Hoboken.
Nichols, Frank,	Hoboken.
Ogden, Harry,	Hoboken.
Patterson, William,	Hoboken.
Roberts, Frank,	Hoboken.
Roberts, Edward P.,	Elizabeth.
Robinson, G. W.,	Hoboken.
Robinson, William B.,	Hoboken.
Rosenbaum, John,	Hoboken.
Rule, Eagle,	Hudson City.
Seyfried, Adolph von,	Newark.
Shippen, William W.,	Hoboken.
Stevens, John,	Hoboken.
Syms, Samuel P.,	West Hoboken.
Terry, Frederick C.,	Hoboken.
Vail, George,	Hoboken.
Watson, John H.,	Paterson.
Weiss, David W.,	Hoboken.
Wetmore, Charles W.,	New York City.